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Science and Technology Committee

The UK response to covid-19: use of scientific advice

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to the report*

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Science and Technology Committee

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Summary

The coronavirus pandemic has marked the most significant test of the way that the UK Government takes and acts on scientific advice in living memory.

The scientific community—in academia, in the public sector and in industry—has risen to that challenge in extraordinary and, in many cases, unprecedented ways.

This Committee, on behalf of the House of Commons, is deeply grateful for the tireless, expert and unstinting work of everyone who has sought to understand the threat of covid-19 from its earliest appearance, and who have brought their experience, ingenuity and judgement to bear on mitigating its impacts and seeking treatments and vaccines against it.

The high reputation of UK science is founded on openness and relentless self-challenge—looking always to test current theories and practices against new evidence and explanations, without sentiment and with a relish for discovery.

The Science and Technology Committee in its continuing inquiry has sought to apply that same spirit. Through asking questions of expert witnesses and scrutinising written evidence our aim has been to do two things:

- Distil from a necessarily complex and evolving response to a previously unknown virus lessons that can usefully be learned—positive and negative—that can be put into practice to help decisions yet to be taken, both in the remaining course of the pandemic and beyond; and
- Capture contemporary evidence from what the people taking decisions, those advising them and those working on the response to the pandemic thought at the time, so that future inquiries need not be only through the lens of hindsight.

In May, the Committee wrote to the Prime Minister and the Secretary of State for Health and Social Care with some recommendations drawn from the experience of the first few months of the pandemic.¹

This Report considers, specifically, the ways in which the Government has obtained and made use of scientific advice during the pandemic to date.

During the weeks ahead, both as the Science and Technology Committee and in our joint “lessons learned” inquiry with the Health and Social Care Committee, we will set out further evidence and findings on areas including the test and trace system, the development of vaccines and the preparedness for this emergency.

In particular, the remarkable achievement of developing and being in a position to deploy multiple vaccines against a deadly and virulent virus that was completely unknown a little over a year ago ranks as one of the most outstanding scientific accomplishments of recent years—we will consider the lessons to be learned from the scientific, public policy and administrative contributions to this success in a subsequent Report.

¹ [Correspondence from Chair to the Prime Minister regarding lessons learned so far from the covid-19 pandemic](#), 18 May 2020 (Annex One)

This Report is structured as follows:

In Chapter two, we consider how scientific advisory and key decision-making structures evolved in the early stages of the pandemic, through evidence we gathered from Chief Medical and Scientific Advisers, as well as the Secretary of State for Health and Social Care.

Chapter three explores the initial awareness of the novel coronavirus in the UK Government as well as the activation and operation of SAGE itself. While it is apparent to us that science advisory mechanisms responded quickly, there is an open question regarding the longer-term operation of SAGE and the impacts on the independent experts who participate—and their research staff and technicians—as well as the Government officials who support SAGE.

The transparency and communication of science advice is discussed in Chapter four. While it is regrettable that there were initial delays in the publication of SAGE evidence, minutes and the disclosure of expert advisers, we are pleased that a regular drumbeat of public information was eventually established. Nevertheless, we have concerns that the lessons from this experience have not been consistently applied, and call for the Government to publish the advice it has received on indirect effects of covid-19 (including impacts on mental health and social wellbeing, education and the economy) and work to improve transparency around the operation of the Joint Biosecurity Centre.

In Chapter five, we discuss the breadth of expertise drawn upon by the Government through SAGE. We conclude that there was a particular reliance on epidemiological modelling expertise at the beginning of SAGE's operation—reflecting the paucity of real world data early in the pandemic—and identify an apparent gap in the provision of independent advice on non-medical impacts. We also consider the issue of poor data flows, which have hampered the work of SAGE and other experts in understanding the pandemic.

Our final Chapter presents a number of instances that exemplify how effectively science advice was used, in different policy areas, over the course of the pandemic. In Chapter six we consider the following examples in which science advice has been a key component: testing capacity; social distancing measures, such as face coverings; and the development of potential vaccines and therapeutics.

Key findings

Our overall conclusions are that:

1. During the first part of the pandemic, the Government was serious about taking and following advice from scientists of international repute, through a structure that was designed and used during previous emergencies.
2. The length of the pandemic to date has placed extraordinary demands on the scientific advisers to Government. The Government Chief Scientific Adviser, the Chief Medical Officers, their teams, ministers and officials in Departments, the devolved administrations, the NHS, public health teams in Public Health England and local authorities, and each of the participants in SAGE and its sub-groups have worked

intensively and continuously since the beginning of the pandemic. The structures for science advice in emergencies have been based around shorter term emergencies and the Government should consider the resilience of the arrangements for when they are needed to ensure in the longer term.

3. Initially, there was a lack of transparency about who were the scientists who served on the Government's advisory body, SAGE, and what evidence and scientific papers their advice drew on. This has been improved following our earlier letter to the Government Chief Scientific Adviser, but there is still insufficient visibility as to what advice was given to the Government and over the transparency of the operation and advice of the new Joint Biosecurity Centre.

4. Although the Government was advised by many experts of distinction, and generally followed the advice that was given, the outcome during the first wave of the pandemic is not regarded as having been one of the best in the world.²

While the experience of no country is perfectly comparable with others, it will be important to understand the reasons for this in order to learn lessons for the future. In this Report, there are questions of how quickly scientific analysis could be translated into Government decisions; whether full advantage had been taken of learning from the experience of other countries; and the extent to which scientific advice took as a given operational constraints, such as testing capacity, or sought to change them.

5. Measures taken to contain the pandemic had wider and indirect effects, such as on people's livelihoods, educational progress and mental and emotional wellbeing. The assessment of these wider impacts was—and remains—much less transparent than the epidemiological analysis; the people conducting the analysis and giving advice are less visible than epidemiological modelling advisers; and its role in decision making opaque.

6. The public has benefitted from seeing and hearing directly from scientists advising the Government, and overall trust in science has remained high despite the inevitability that scientific advice has often been associated with restrictions on people's activities and sometimes the focus of contention. As the Office for Statistics Regulation advised, in order to maintain high levels of confidence, data and statistics should be presented in ways that align with high standards of clarity and rigour—especially when they are used to support measures of great public impact.

7. A fully effective response to the pandemic has been hampered by a lack of data. For a fast-spreading, invisible, but deadly infection, data is the means of understanding and acting upon the course of the virus in the population. The early shortage of testing capacity—restricting testing only to those so ill that they were admitted to hospital—had the consequence of limiting knowledge of the whereabouts of covid-19. The ONS Infection Survey did not begin until May, and the fragmentation of data across public organisations has impeded the agility and precision of the response.

2 Sir Patrick Vallance told us in July it was "clear that the outcome in the UK has not been good" and that there was a "band of countries that have done less well" ([Q1043](#)). Further, Professor Neil Ferguson suggested to us in June that the UK's position, in terms of per-capita deaths from covid-19, would not "necessarily change in a European setting" ([Q942](#)).

8. The increase in testing capacity that took place from April was driven principally by a target set by the Secretary of State for Health and Social Care rather than following a scientifically-based plan of what capacity was needed. While testing capacity has increased dramatically, it is still unclear what exact assessment has been made of the testing targets required in the management of the pandemic.

In each instance, the approach we have taken is to draw on the evidence that has been presented to the Committee, orally and in writing, and to draw out lessons by way of recommendations to the Government—which is required to respond formally to the Report.

Where recommendations reflect findings that things could have been done better we make them, in keeping with the scientific approach, not to apportion blame but—recalling the acute uncertainty and urgency with which decisions have had to be made—but to provide a means continually to improve our collective response to this, and future emergencies.

1 Introduction

Covid-19

1. A coronavirus is a common type of virus that can cause intestinal and respiratory illness in humans and animals, with symptoms including fever, coughing and more severe issues including pneumonia. Seven different coronaviruses have been found in humans, which mostly cause cold-like symptoms, except for the viruses that cause severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and covid-19.³
2. The emergence of a novel coronavirus, previously unseen in humans, was first reported in the city of Wuhan in China on 31 December 2019.⁴ The first case of the novel disease outside of China was reported on 13 January in Thailand.⁵ On 22 January, the World Health Organisation (WHO) issued a statement saying there was some evidence of human-to-human transmission.⁶ On 30 January 2020, the WHO declared the outbreak a ‘Public Health Emergency of International Concern’.⁷ On 31 January 2020, the first two cases of covid-19 were confirmed in the UK (in England).⁸ The first death from covid-19 in the UK (in England) was announced on 5 March.⁹ On 11 March, the WHO “made the assessment that covid-19 can be characterized as a pandemic”.¹⁰
3. The International Committee on the Taxonomy of Viruses (responsible for naming all new viruses) named the 2019 coronavirus SARS-CoV-2 and the disease caused by the virus was named covid-19 by the WHO.¹¹ In this Report we use covid-19 to refer to the disease and ‘coronavirus’ to refer to the virus.

Our inquiry

4. On 10 March 2020, we held a wide-ranging private briefing to gain an overview of the scientific understanding of covid-19 and to explore issues relating to diagnostics, therapeutics and vaccines.¹² On 20 March the Committee launched a call for written evidence as part of our inquiry, *UK Science, Research and Technology Capability and Influence in Global Disease Outbreaks*. We sought views relating to a number of issues in relation to managing a disease outbreak.
5. Between 25 March and 3 November 2020, we held 15 public evidence sessions. We took evidence from over 50 individuals, including the Secretary of State for Health and Social Care, Matt Hancock MP, the UK Government Chief Scientific Adviser, Sir Patrick Vallance, Chief Medical Officers from the four nations of the UK, Public Health England, NHS England, participants of the Scientific Advisory Group for Emergencies, those

3 UK Research and Innovation, [Coronavirus: the science explained](#), accessed 4 December 2020

4 World Health Organisation, [Listings of WHO’s response to COVID-19](#), accessed 4 December 2020

5 World Health Organisation, [WHO statement on novel coronavirus in Thailand](#), 13 January 2020

6 World Health Organisation, [Mission summary: WHO Field Visit to Wuhan, China](#), 22 January 2020

7 World Health Organisation, [Listings of WHO’s response to COVID-19](#), accessed 4 December 2020

8 GOV.UK, [CMO confirms cases of coronavirus in England](#), 31 January 2020

9 GOV.UK, [CMO for England announces first death of patient with COVID-19](#), 5 March 2020

10 World Health Organisation, [Listings of WHO’s response to COVID-19](#), accessed 4 December 2020

11 World Health Organisation, [Naming the coronavirus disease \(COVID-19\) and the virus that causes it](#), accessed 4 December 2020

12 Science and Technology Committee, [Committee scrutinises UK response to COVID-19 outbreak](#), 20 March 2020

involved in developing vaccines and treatments and many others.¹³ We received over 100 pieces of written evidence from a similarly broad range of individuals and organisations.¹⁴ We are grateful to all those who provided oral and written evidence to our inquiry.

6. Recognising that further scrutiny of the pandemic would be necessary over the winter months, on 8 October we launched a joint inquiry with the Health and Social Care Committee into *coronavirus: lessons learnt*.¹⁵ This Report does not cover that work.

Aims of this Report

7. In this Report we focus on the science advice provided to the UK Government leading up to November 2020 and we also analyse the Government's response to it. While some of the evidence we have considered applies to the whole of the United Kingdom, much of our commentary focuses on the decisions and actions of the UK Government and public bodies in England.

8. The purpose of this Report is not to apportion blame, nor is it to give an overall verdict of how the UK has performed—the time for such an evaluation will come. We therefore seek in this Report to take a balanced, objective and constructive approach, highlighting where things could have and should have been better, where the Government has taken the right approach, and identifying where the Government has the opportunity to learn lessons for future phases of handling the virus in the UK.

9. Our decision to take evidence during a live emergency scenario—with its inherent uncertainty—was deliberate. The reasons for this are to identify lessons to apply immediately, as described above, but also to ensure that there is a public record of the decisions and assessments made throughout the pandemic, so that future scrutiny does not need to rely on recollections and hindsight. This is also why in May we wrote to the Prime Minister with some of our initial findings (see Annex One for a copy of the letter).¹⁶

10. Our efforts as a Committee have, as reflected throughout this Report, focused predominantly on the scientific and technical advice that was drawn upon in the early stages of the pandemic. We have also taken a great interest in understanding the interventions taken in other countries, as scientific evidence and discussion are global by nature and therefore there may be appropriate learnings to take from the experiences of others. While scrutiny of the operational aspects of dealing with the novel coronavirus are rightly the reserve of other departmental Select Committees, we believe it is important that we consider how operational decision-making and advice have been structured during this period, so that we may reflect more fully on whether scientific advisory mechanisms have been fit for purpose.

13 Transcripts of our oral evidence sessions can be viewed here: <https://committees.parliament.uk/work/91/uk-science-research-and-technology-capability-and-influence-in-global-disease-outbreaks/publications/oral-evidence/>

14 Written evidence received as part of our inquiry can be viewed here: <https://committees.parliament.uk/work/91/uk-science-research-and-technology-capability-and-influence-in-global-disease-outbreaks/publications/written-evidence/>

15 Health and Social Care Committee and Science and Technology Committee, [Parliamentary Committees join forces: Inquiry launched to scrutinise Government response to the COVID-19 pandemic](#), 8 October 2020

16 [Correspondence from Chair to the Prime Minister regarding lessons learned so far from the covid-19 pandemic](#), 18 May 2020

11. In this Report:

- Chapter two explores the advisory and decision-making structures within Government and their evolution throughout the pandemic;
- Chapter three considers logistical aspects of the Scientific Advisory Group for Emergencies (SAGE), including its activation and operation;
- Chapter four explores the transparency of science advice and advisers, including how effectively advice was communicated to Government decision-makers and the public;
- Chapter five discusses the nature of the scientific advice supplied to the Government, including the breadth and diversity of expertise and data considerations; and
- Chapter six considers a number of policy areas in which science advice has been a key component: testing capacity, social distancing measures, such as face coverings, and the development of potential vaccines and therapeutics.

2 Expert advice and Government decision-making structures

12. The United Kingdom is home to one of the most accomplished scientific bases in the world,¹⁷ and houses experts in many fields relevant to the coronavirus pandemic, including social science, epidemiology, public health and clinical studies.¹⁸ As such, the Government has had the opportunity to capitalise on a wide range of expertise from the very outset of the pandemic.

13. Decision-making structures in Government, and the mechanisms for science advice, have evolved throughout the covid-19 pandemic as the nature of the response has shifted from initial crisis management to long-term and ongoing management of the disease. In this Chapter, we set out the mechanisms of science advice and decision-making at the heart of the UK Government, with particular attention to central Government and the Scientific Advisory Group for Emergencies (SAGE).

Scientific advisory structures in the pandemic

UK Government

The Scientific Advisory Group for Emergencies (SAGE)

14. SAGE is the primary mechanism responsible for providing “timely and coordinated” scientific and technical advice in emergency scenarios to Cabinet Office Briefing Room (COBR) meetings.¹⁹ The role of COBR is discussed later in this Chapter (see paragraph 27). The covid-19 pandemic marked the ninth occasion for which SAGE has been activated since 2009—when the group was first conceived after the Scientific Advisory Panel on Emergency Response was dissolved—and the fourth time the group has been convened in that period to consider an infectious disease-related health emergency.^{20,21}

15. SAGE meetings throughout the pandemic have been co-chaired by the Government Chief Scientific Adviser, Sir Patrick Vallance, and the Chief Medical Officer for England, Professor Chris Whitty, with the secretariat operated through the Government Office for Science. SAGE’s first “precautionary” meeting was held on 22 January 2020, 13 days after China reported to the WHO that an outbreak of pneumonia cases in Wuhan was caused by a novel coronavirus.²² We also note reports that COBR, which SAGE reports to, was initially chaired by the Secretary of State for Health and Social Care, with the Prime Minister chairing his first COBR meeting on 2 March.²³ The current iteration of SAGE

17 UK Government, [International Comparative Performance of the UK Research Base](#), October 2017; UK Government, [International Comparison of the UK Research Base: Accompanying note](#), July 2019

18 UK Government, [SAGE explainer](#), 5 May 2020

19 GOV.UK, [About the Scientific Advisory Group for Emergencies](#), accessed 25 September 2020

20 Science and Technology Committee, Third Report of Session 2010–11, [Scientific advice and evidence in emergencies](#), HC 498, March 2011

21 SAGE was previously active during the 2009 Swine Flu pandemic, the 2014 Ebola outbreak and the 2016 Zika outbreak. Science advice during the Swine Flu pandemic (<https://publications.parliament.uk/pa/cm201011/cmselect/cmsctech/498/49802.htm>) and Ebola outbreak (<https://publications.parliament.uk/pa/cm201516/cmselect/cmsctech/469/46902.htm>) were considered by predecessor Science and Technology Committees.

22 World Health Organisation, [Listings of WHO’s response to COVID-19](#), accessed 26 November 2020

23 UK Government, [PM to chair COBR meeting on the coronavirus outbreak](#), 2 March 2020

marks the longest period over which the group has remained activated since 2009—in the period between 22 January and 3 November, the date of our last evidence session as part of this inquiry, SAGE had met sixty-four times, often twice weekly.²⁴

16. Explaining the function of SAGE during the pandemic to the Joint Committee on the National Security Strategy, Sir Patrick indicated that the operation of SAGE was “slightly more complicated” than its formal role of reporting to the Civil Contingencies Secretariat—the body within the Cabinet Office responsible for the coordination of planning and response to civil emergencies—and COBR alone:

The Cabinet Office has established a structure for dealing with Covid with a central team based in the Cabinet Office and ministerial committees that take accountability—plus, of course, there are lead departments, the most central of which is the [Department of Health and Social Care (DHSC)]. The output from SAGE goes to all departments. It goes to the Cabinet Office Covid task force and will feed into the ministerial committees. It will also go obviously to the DHSC. It is worth saying that there are other forms of scientific advice that feed in through departments, and each of the chief scientific advisers in the departments will listen to SAGE and take their own information back to departments. Many of them will have their own advisory boards feeding into specific questions in departments—they are much more operational than SAGE would be. The DHSC has its own forms of scientific advice to feed in, as well.²⁵

Scientific advisory committees

17. Government guidance on SAGE from 2012 has indicated the likely need for SAGE to establish sub-groups:

To enable SAGE to both review and validate research and undertake new assessments, analysis and modelling it is likely to be necessary to create sub-groups. The effective use of sub-groups can also help ensure that discussion groups within SAGE are of a manageable size.²⁶

18. The Government Chief Scientific Adviser outlined in a letter to the Committee in April that SAGE had taken advice from a number of groups.²⁷ The expert groups discussed in the letter included a number of pre-existing advisory groups that were co-opted from the Department of Health and Social Care:

- the Scientific Pandemic Influenza Group on Modelling (SPI-M) (40–45 participants);
- the Scientific Pandemic Influenza Group on Behavioural Science (SPI-B) (18 participants); and

24 GOV.UK, [SAGE minutes](#)

25 Oral evidence taken before the Joint Committee on the National Security Strategy on 19 October 2020, ([Q43](#))

26 UK Government, [Enhanced SAGE guidance](#), p.16, October 2012.

27 [Letter from Sir Patrick Vallance to the Chair of the Committee on SAGE composition dated 4 April 2020](#). Number of participants in these groups is correct as at the time of Sir Patrick’s letter

- the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) (16 participants).²⁸

Further information on the sub-groups feeding into SAGE was subsequently published on 4 May.²⁹

Chief Scientific Adviser network

19. The UK Government's network of departmental Chief Scientific Advisers (CSAs) exists to provide an "independent challenge function to their department" and "are mechanisms in place to ensure that policy making is underpinned by science and engineering."³⁰

20. Professor Alan Penn, CSA to the Ministry of Housing, Communities and Local Government, outlined to us how CSAs were guiding the decision-making process in the context of the coronavirus pandemic:

The way I would interact is generally in informing policy colleagues within the Department about the science and the evidence, as I understand it, coming from SAGE to help to ensure that when it is drawing up policies to go up to Cabinet Office for decision it is taking account of the science.³¹

21. Departmental CSAs have frequently attended SAGE meetings, either as participants or observers, and some more than others depending on their area of expertise. For example, Professor John Aston told us in May that he had attended almost all previous SAGE meetings "partly in my role as chief scientific adviser at the Home Office, but partly in my role as a professor of statistics at Cambridge and so as a statistician".³² However, Osama Rahman, Director of Analysis and CSA to the Department for Education indicated that his attendance of SAGE meetings had been less frequent and only "whenever things to do with children or schools have been discussed."³³ Nevertheless, Professor Penn suggested that CSAs were available to attend any SAGE meetings relevant to their scientific expertise or their CSA duties.³⁴

The Joint Biosecurity Centre

22. On 1 June 2020, the Government established a new Joint Biosecurity Centre (JBC)—first announced by the Prime Minister in May³⁵—as a directorate within the Department of Health and Social Care.³⁶ The UK Government covid-19 recovery strategy, published in May, outlined the two main functions of the JBC:³⁷

28 (i) <https://www.gov.uk/government/groups/scientific-pandemic-influenza-subgroup-on-modelling>; (ii) <https://www.gov.uk/government/groups/independent-scientific-pandemic-influenza-group-on-behaviours-spi-b>; (iii) <https://www.gov.uk/government/groups/new-and-emerging-respiratory-virus-threats-advisory-group>

29 GOV.UK, [List of participants of SAGE and related sub-groups](#), accessed 12 October 2020

30 UK Government, [Guidance for government Chief Scientific Advisers and their Officials](#), p.6, January 2020

31 Professor Alan Penn, Chief Scientific Adviser, Ministry of Housing, Communities and Local Government ([Q497](#))

32 Professor John Aston, Chief Scientific Adviser, Home Office ([Q541](#))

33 Osama Rahman, Director of Analysis and Chief Scientific Adviser, Department for Education ([Q489](#))

34 Professor Alan Penn, Chief Scientific Adviser, Ministry of Housing, Communities and Local Government ([Q490](#))

35 UK Government, [Prime Minister's address to the nation](#), 10 May 2020

36 UK Government, [Joint Biosecurity Centre](#), published 24 September 2020, accessed 6 October 2020

37 UK Government, [Covid-19 Recovery Strategy](#), p41, May 2020

- a) an “independent analytical function” to provide real-time analysis of infection rates across the country, in addition to advising the four UK Chief Medical Officers of a change in the covid-19 Alert Level; and
- b) a “response function” that would “identify specific actions to address local spikes in infections, in partnership with local agencies”.

23. The Government have stated that the JBC “complements” the work of SAGE, supporting the work of the advisory group with “operational capability, including data analysis and epidemiological expertise”. Nevertheless, we note that in October the Government Chief Scientific Adviser suggested to the Joint Committee on the National Security Strategy that the JBC could function as a replacement for SAGE in the longer term:

As things become more chronic problems, it is rather important that departments pick up the running of [operations]. The [Department of Health and Social Care] has done a lot, which is part of why organisations like the Joint Biosecurity Centre have come into play: because there needs to be a longer-term, more stable system with internal government science providing advice into it, plus getting its own external input, rather than thinking that you can run this from SAGE for the whole time. SAGE is an advisory body built up largely from external academics. It is not part of the government operational machinery and certainly cannot run for very long periods.³⁸

Science advice in the devolved nations

24. We heard about how the devolved nations had established complementary structures to SAGE. With regard to the Scottish Government Covid-19 Advisory Group,³⁹ Dr Gregor Smith, Interim Chief Medical Officer (CMO) for Scotland, told us that while an early relationship with SAGE was “very useful [...] as time progressed it was becoming apparent that a lot of the discussion was increasingly focused on the English context and models were being applied in the English context”. Nevertheless, Dr Smith indicated that the Scottish advisory group was “very much complementary to the existing SAGE structures” and benefitted from reciprocity of information.⁴⁰ The CMO for Northern Ireland, Dr Michael McBride, told us that the executives in Northern Ireland and the Republic of Ireland had drawn up a “memorandum of understanding” covering topics including “modelling and behavioural science and issues relating to research ethics”.⁴¹ Dr Frank Atherton, CMO for Wales, described to us that a “technical advisory cell”⁴² had been established in the Welsh Government to “translate [SAGE advice] into the Welsh context”.⁴³

25. In terms of the potential impact on policy decisions, the Royal Society of Edinburgh suggested to us that while it had noted “increasing levels of divergence across the four nations in the policy response to the pandemic”, this was likely due to “differing policy priorities, approaches, timeframes and operational capabilities as opposed to conflicting scientific advice”.⁴⁴

38 Oral evidence taken before the Joint Committee on the National Security Strategy on 19 October 2020, (Q44)

39 Scottish Government, [Scottish Government COVID-19 Advisory Group](#), accessed 10 December 2020

40 Dr Gregor Smith, Chief Medical Officer for Scotland (Q271)

41 Dr Michael McBride, Chief Medical Officer for Northern Ireland (Q275)

42 Welsh Government, [Technical Advisory Cell](#), accessed 10 December 2020

43 Dr Frank Atherton, Chief Medical Officer for Wales (Q277)

44 Written evidence submitted by the Royal Society of Edinburgh (C190103)

26. The four CMOs of the UK expressed in evidence to us that regular liaison between the four nations was taking place at the expert adviser level. For example, Dr Gregor Smith explained in April that the CMOs spoke “at a minimum three times a week” and took “various opportunities to ensure that we link with one another through senior clinician groups or through more ad hoc meetings” depending on urgency.⁴⁵ Further, Professor Chris Whitty indicated that the CMOs all interacted regularly with “our own chief scientific advisers to Government”.⁴⁶

Key decision-making structures in the UK Government during the pandemic

Cabinet Office and COBR

27. COBR—named after the Cabinet Office Briefing Rooms—is the high-level body responsible for coordinating central Government decision-making in response to emergencies and is the body responsible for activating SAGE.⁴⁷ COBR brings together Ministers and senior officials from relevant UK Government departments and agencies along with representatives from other relevant organisations.

28. The Institute for Government (IfG), an independent think tank, has produced a series of infographics giving an overview of how decision-making in central Government evolved throughout the first six months of the coronavirus pandemic in the UK (see Figure 1).⁴⁸ The IfG identified four main phases, with the Government introducing ‘ministerial implementation groups’ before shifting to a structure coordinated by two Cabinet Committees:

45 Dr Gregor Smith, Chief Medical Officer for Scotland ([Q269](#))

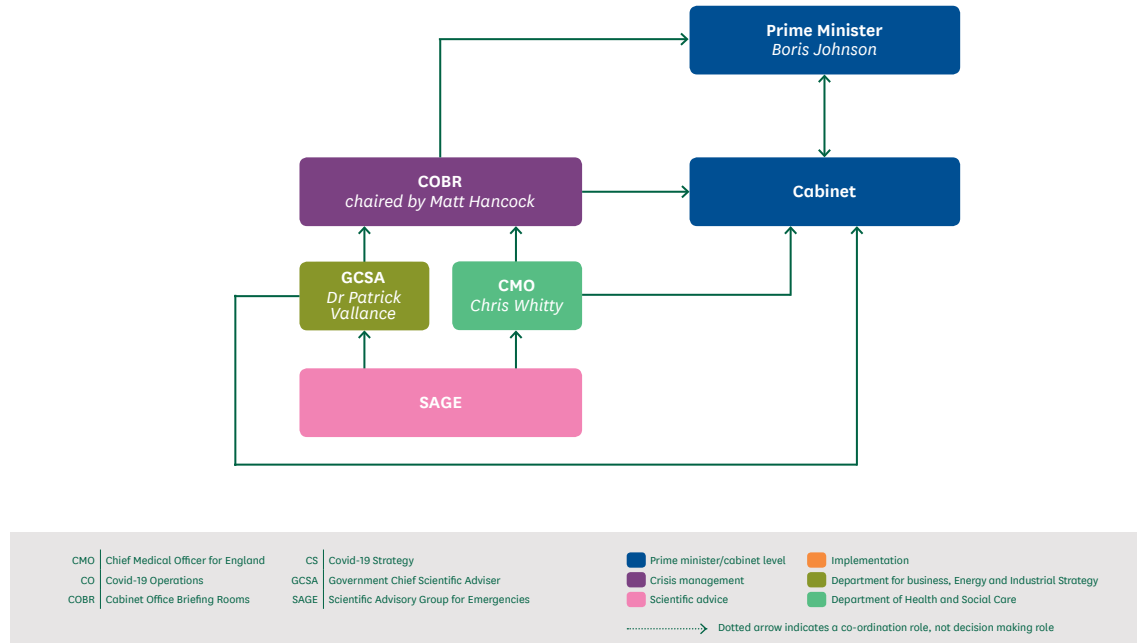
46 Professor Chris Whitty, Chief Medical Officer for England ([Q270](#))

47 UK Government, [Responding to emergencies: The UK central government response](#), p.21, April 2013

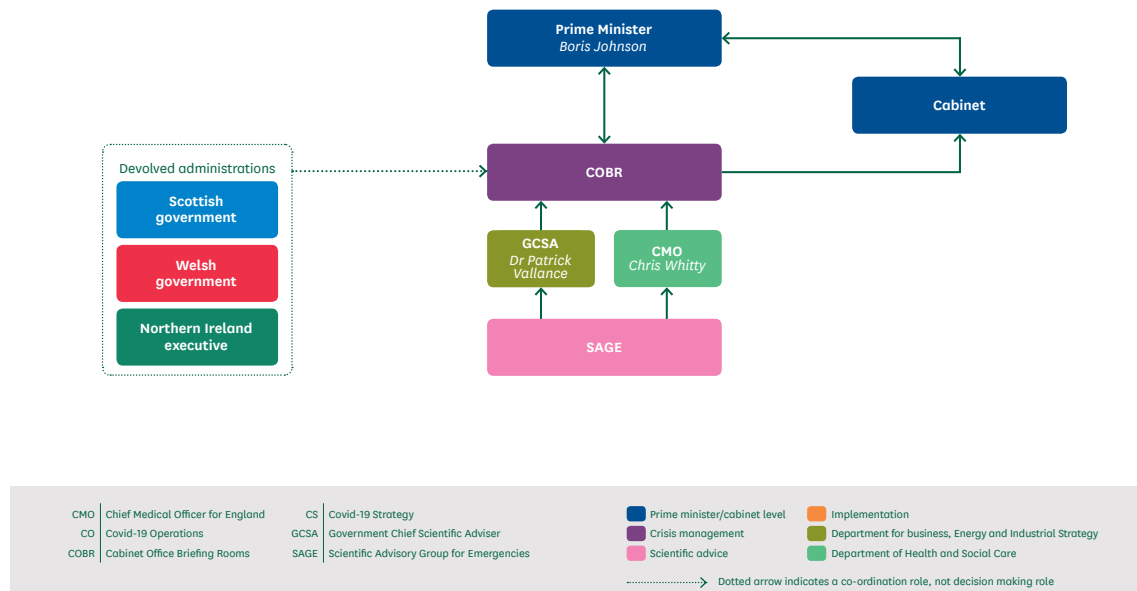
48 Institute for Government, [UK Government coronavirus decision making: key phases](#), 29 June 2020

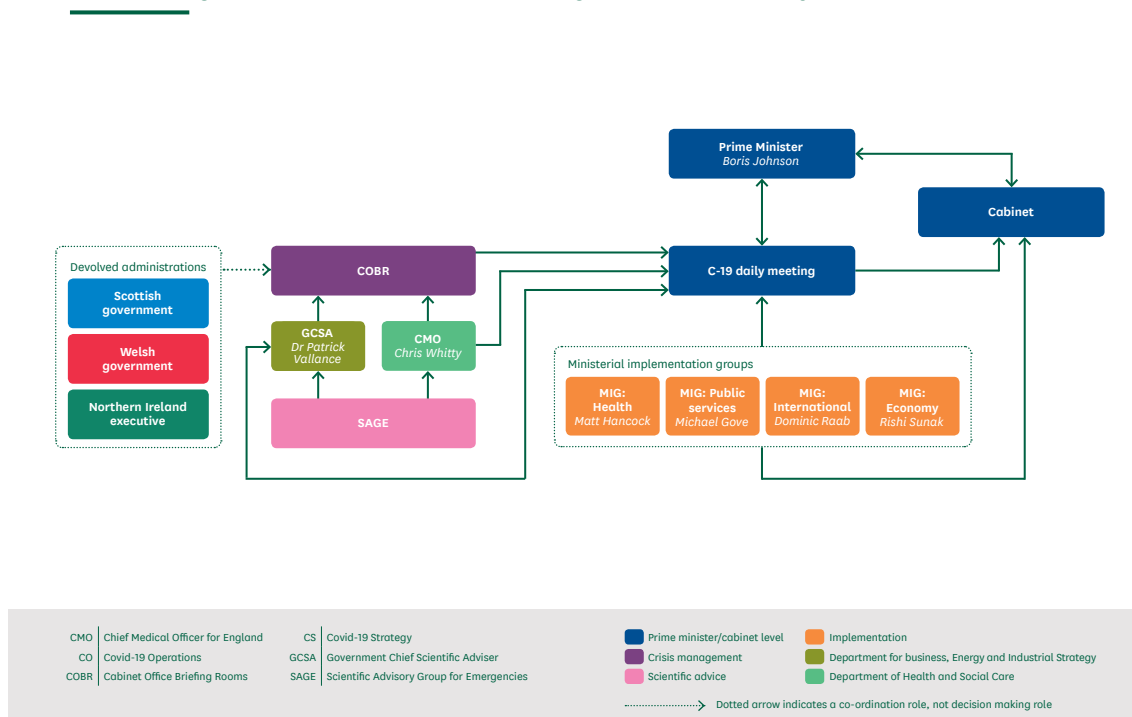
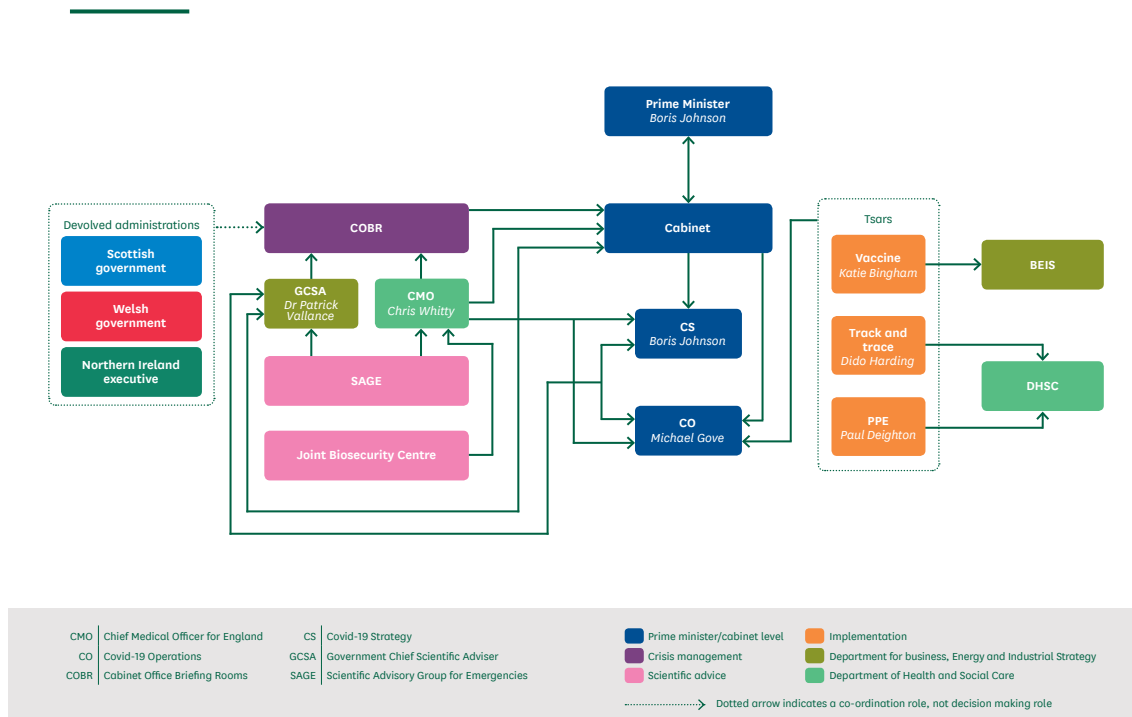
Figure 1: The evolution of Government decision-making structures in the early months of the covid-19 pandemic.

Phase 1 of UK government coronavirus decision making: January to February



Phase 2 of UK government coronavirus decision making: March



Phase 3 of UK government coronavirus decision making: mid-March to mid-May**Phase 4 of UK government coronavirus decision making: mid-May to June**

Source: Adapted (with permission) from the [Institute for Government](https://www.instituteforgovernment.org.uk/)

29. It is apparent that in the first few months of managing the pandemic, decision-making was focused within the centre of Government. For example, it was made clear to us by MHCLG's CSA Professor Alan Penn that "decisions by and large have been taken centrally at Cabinet Office level", with Osama Rahman—the Department for Education's CSA and Director of Analysis—offering an example from early in the pandemic:

the decision to close schools and a suite of further social distancing measures was a Cabinet decision with advice from SAGE. It was fed through to Cabinet via Patrick Vallance and the chief medical officer.⁴⁹

30. Decision-making has shifted initially from COBR to other structures within the Cabinet Office. The Secretary of State for Health and Social Care, Matt Hancock MP, suggested to us in July that the majority of decision-making had been “replaced” by “a permanent Cabinet Committee structure to deal with cross-Government decisions relating to coronavirus”:

there is a Covid-O, which takes the operational decisions and meets two or three times a week, and then that reports into Covid-S, which takes the strategic decisions and is chaired by the Prime Minister.⁵⁰

While the Secretary of State did not state when this change took place, the membership of the two new Cabinet Committees was published on 29 June 2020.⁵¹ Further, the Secretary of State indicated that these committees were supported by their own secretariat, and not the Civil Contingencies Secretariat, which is responsible for supporting COBR.⁵²

Other decision-making structures

31. Guidance on containing and managing local coronavirus outbreaks—first published by the Government on 17 July—describes a “Local Action Committee command structure” which sits under COVID-O to consider national and local epidemiological information.⁵³ The command structure is split into three tiers:

- a Local Action Committee (gold), chaired by the Secretary of State for Health and Social Care;
- a Weekly Containment Group (silver), also chaired by the Chief Medical Officer; and
- a Daily Containment Group (bronze), with a “rotating” chairship.

32. While this Report does not include a detailed discussion on the effectiveness of local decision-making, we note that the guidance claims that local authorities will be able to draw upon “analytical support and advice” from the Joint Biosecurity Centre and Public Health England.

33. **The coronavirus pandemic marks the most significant test of the UK’s emergency advisory and decision-making structures in living memory. As such, it is important that lessons are drawn throughout and applied so that the Government and future Governments may be better placed to respond to future crises. This has been the purpose of our inquiry—to capture those early lessons in the course of the pandemic. The machinery of science advice and decision-making has evolved throughout the Government’s management of the covid-19 pandemic, however there is an open question regarding the long-term sustainable and efficient provision of science**

⁴⁹ Professor Alan Penn, Chief Scientific Adviser, Ministry of Housing, Communities and Local Government ([Q497](#)); Osama Rahman, Director of Analysis and Chief Scientific Adviser, Department for Education ([Q495](#))

⁵⁰ Matt Hancock MP, Secretary of State for Health and Social Care ([Qq1192–1206](#))

⁵¹ UK Government, [List of Cabinet Committees and their membership](#), 29 June 2020

⁵² Matt Hancock MP, Secretary of State for Health and Social Care ([Qq1192–1206](#))

⁵³ UK Government, [Containing and managing local coronavirus \(covid-19\) outbreaks](#), accessed 13 October 2020

advice to Government. Further, it remains unclear—in the long term—what role the Scientific Advisory Group for Emergencies (SAGE) will play, and—as alluded to by the Government Chief Scientific Adviser—how organisations such as the Joint Biosecurity Centre will provide a solution to the provision of science advice to Government in the coronavirus pandemic and beyond. We are concerned that at the present time the operation of the Joint Biosecurity Centre and the advice that it gives is not fully transparent. *The Government, whatever organisational structures it decides upon, should commit to publishing the scientific advice it receives unless there are matters of national security (see paragraphs 59 to 64). The Government should outline in response to this Report how it intends for science advice on the novel coronavirus to operate in the longer-term management of the pandemic and what roles will be played by new bodies including the National Institute for Health Protection and the Joint Biosecurity Centre, alongside SAGE.*

34. *The Cabinet Office and Government Office for Science should update SAGE guidance to set out the role that SAGE will play in advising the Government's long-term management of emergency scenarios.*

3 Activation and operation of SAGE

Timeliness of coordinating SAGE and science advice

35. The purpose of mechanisms such as SAGE and COBR is to ensure that the delivery of scientific advice to decision-making is in step with the rapid nature of how an emergency unfolds. While the timing of advice and decisions on specific interventions will be discussed in later Chapters, this Chapter considers the broad timing of scientific advice from the outset of the pandemic.

Initial awareness of the outbreak in China

36. In our initial public hearing in March, Dr Richard Horton, editor of the Lancet, expressed his concern that the Government had not responded rapidly to the emerging threat in China:

what strikes me is the mismatch between the urgent warning that was coming from the frontline in China in January and the, honestly, somewhat pedestrian evaluation of the likely severity of the outbreak in [SAGE] evidence.⁵⁴

Dr Horton suggested that three Lancet academic papers detailing the outbreak in China—published on 24, 30 and 31 January—did not appear to have been considered by SAGE.⁵⁵

37. However, at the same meeting Sir Patrick Vallance indicated that advisers in central Government were aware of the issue in January:

very early on there were two things that could happen [...] Either China could contain this completely and it would go away—that was one possibility—or they would not contain it and it would spread and become a pandemic [...] Early in January, it was not clear which of those would be the case.⁵⁶

Further, Professor Chris Whitty, Chief Medical Officer (CMO) for England, informed us that he first discussed the news of the emerging outbreak with one of the deputy Chief Medical Officers on 2 January.⁵⁷ Sir Patrick also told us in March that by the time the WHO had officially declared the crisis as a pandemic situation on 11 March, the UK Government was already “planning that it would go across the world”.⁵⁸

38. This is supported by the first “precautionary” SAGE meeting being held on 22 January 2020,⁵⁹ less than one month after China reported the first cluster of coronavirus cases and eight days before the World Health Organisation declared the outbreak a Public Health

54 Dr Richard Horton, Editor-in-Chief of The Lancet (Q39)

55 (i) Wang, C. et al., [A novel coronavirus outbreak of global health concern](#), The Lancet, 24 January 2020; (ii) Chen, N. et al., [Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study](#), The Lancet, 30 January 2020; (iii) Wu, J T. at al., [Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study](#), The Lancet, 31 January 2020.

56 Sir Patrick Vallance, UK Government Chief Scientific Adviser (Q101)

57 Professor Chris Whitty, Chief Medical Officer for England (Q330)

58 (i) Sir Patrick Vallance, UK Government Chief Scientific Adviser (Q101) (ii) World Health Organisation, [Listings of WHO's response to COVID-19](#), accessed 4 December 2020

59 UK Government, [Precautionary SAGE 1 minutes](#), 22 January 2020

Emergency of International Concern (PHEIC).⁶⁰ Nevertheless, details of this first SAGE meeting were not made public for some time, with the minutes alone being published on 29 May.

Setting up SAGE

39. Written evidence submitted by a collective of University researchers who interviewed “senior scientists” advising the Government and its agencies—indicated the view that “the UK’s early warning systems for emerging infectious disease, situated in PHE, served their purpose well.” However, they also suggested that it took a few weeks to get SAGE set up fully. One interviewee told the researchers that processes around SAGE were “extremely confused to begin with” amidst advisers joining the group “at a rate of knots”.⁶¹

40. Similarly, written evidence submitted by the Royal Society explained that the systems needed to coordinate science advice “were not initially in place” and therefore the pandemic “initially overwhelmed the UK Government’s abilities to access and deploy the UK’s operational science capabilities at sufficient scale and speed”. On the Government’s outreach to the wider scientific community—including with the National Academies—the Royal Society suggested there was an “unplanned reactive effort”.⁶² The Physiological Society also suggested that opportunities to engage with the Government were “piecemeal”.⁶³

Timeliness of advice and decision-making

41. The Secretary of State for Health and Social Care, Matt Hancock MP, told us in July that “various SAGE conclusions, especially on lockdown measures or the non-pharmaceutical interventions, were followed in a timely manner, in some cases on the same day.”⁶⁴ Sir Patrick Vallance nevertheless impressed upon us in July that “the ultimate decisions are a mixture of policy and timing”, which were outside of SAGE’s control and that timing of decisions was “a policy question”.⁶⁵

42. Written evidence from the University of Liverpool and the University of Oxford suggested that while “scientific advice to Government was timely [...] decisions based on it were often delayed, particularly during the earlier part of the crisis (January–April)”. Based on interviews with scientists advising the Government, they suggested that “six weeks of opportunity was wasted” and pointed to one interviewee’s comments of:

a couple of heated moments [in mid-March] where [scientific advisers] were saying “you are not moving fast enough”. The Government’s most senior expert advisors, we were told, responded that policy decisions were a process, that the politicians needed to be led through it.⁶⁶

60 World Health Organisation, [Listings of WHO’s response to COVID-19](#), accessed 4 December 2020

61 Written evidence submitted by the National Institute for Health Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections, University of Oxford, Nuffield Department of Primary Care Health Sciences, University of Liverpool, Institute of Infection and Global Health ([C190084](#))

62 Written evidence submitted by the Royal Society ([C190110](#))

63 Written evidence submitted by the Physiological Society ([C190061](#))

64 Matt Hancock MP, Secretary of State for Health and Social Care ([Q1189](#))

65 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1040](#), [Q1056](#))

66 Written evidence submitted by the National Institute for Health Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections, University of Oxford, Nuffield Department of Primary Care Health Sciences, University of Liverpool, Institute of Infection and Global Health ([C190084](#))

43. We are satisfied that the SAGE mechanism responded to the advent of the novel coronavirus in a timely manner and that the most up-to-date scientific research and understanding was readily available to inform the Government from the outset. Nevertheless, we note that submissions presented to us raised concerns that during the early weeks of the pandemic, policy decisions in response to scientific evidence were taken more slowly than was needed, given the rapidity of the spread of the virus.

44. It is disappointing that the details of SAGE's preliminary meetings were not made public for over two months, leading to unnecessary concern and confusion over what advice the Government had been receiving. Indeed, were it not for our early enquiries, this confusion may have continued until the details of SAGE's initial meetings were published at the end of May. We note that SAGE has yet to publish any papers that might have been considered in its first two meetings. *The Government Office for Science should confirm, as soon as possible, whether any papers were considered at the first two SAGE meetings and, if so, it should place them in the public domain.*

45. We believe the initial response in setting up SAGE was timely. We have heard from some sectors of the science community that the community was not consulted appropriately. *The Government should set out in response to this Report how in future emergencies it will engage formally and informally with the community.*

Scientific advice

46. We have heard from numerous participants of SAGE—and its sub-groups—that the science advisory machinery has operated by conveying a central view, whilst reflecting the scientific uncertainty that is associated with covid-19 being an entirely new threat. For example, Professor Neil Ferguson set out his view on the role of external advisers in giving science advice:

The aim of SAGE is to give the co-chairs sight of the best scientific evidence and the uncertainty around specific topics. We are not trying to reduce uncertainty; we are trying to convey to [Sir Patrick Vallance] and [Professor Chris Whitty] what is known about the science and what the uncertainties are, so that they can make a judgment about how they communicate that to Ministers.⁶⁷

Similarly, Sir Patrick Vallance, the Government Chief Scientific Adviser, stressed to us that with “a number of experts and scientists around a table, you are not going to have a discussion in which everyone agrees with everyone else”, pointing out that the group challenged views by discussing alternatives and possible outcomes “at every stage of the process”.⁶⁸

47. In terms of relaying scientific advice to decision-makers, Professor Chris Whitty indicated that SAGE worked to ensure that the nuance between statistical confidence and uncertainty was communicated:

67 Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London ([Q8](#))

68 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q77](#))

One of the things you are trying to convey is both the central projection—this is where on average we think things will go—and the uncertainty around that [...] you ideally also provide confidence intervals.⁶⁹

48. Professor Whitty also gave us an insight into why SAGE sought to distil the scientific evidence—and its associated uncertainties and differences in expert opinion—to provide a central view that maximises its usefulness for Government decision-making:

It is not very useful to Ministers or other decision makers to say, “There are 16 opinions. Here are all 16. Make up your mind.” Part of the process is to say in a unified way, “Here is the central view”, and then, if there are either dissenting views or a range of uncertainty quantitatively around that, to convey it in a way that is comprehensible to the people who are listening so that they understand the certainty with which the advice is being proffered. If they do not, it is clearly going to lead to bad decision making.⁷⁰

Sir Patrick echoed this viewpoint:

What I think is not helpful is to say, “Here are several different views,” and ask somebody who is less knowledgeable to bring these together and come to a single view. In SAGE, we try to come up with a consensus view, but we are always clear and open about how we arrive at that.⁷¹

Sustainability of SAGE participation

49. Reflecting on inviting experts to attend SAGE meetings, Sir Patrick Vallance told us in July that in general “when people are asked if they would help in a Government emergency, the answer is yes. They turn up and work extremely hard at it.”⁷² However, he pointed to the upcoming issue of “how we keep that sustainable for them as the new academic term starts”. We also note later comments made by Sir Patrick to the Joint Committee on the National Security Strategy that SAGE was “not part of the government operational machinery and certainly cannot run for very long periods”.⁷³ Professor Robert MacKay, Director of Mathematical Interdisciplinary Research at the University of Warwick, highlighted that academic expert advisers had “many other obligations” including teaching and administration and as a result colleagues working in epidemiology had been “working round the clock.”⁷⁴ He suggested that mitigating this could involve “a number of fellows to be on research contracts with an agreement to be on call in a relevant crisis”.

50. Professor Neil Ferguson, who has participated in SAGE and is a member of SPI-M (the modelling group that feeds into SAGE), also provided an example of the pressure and urgency facing academic advisers in emergency situations:

69 Professor Chris Whitty, Chief Medical Officer for England ([Q282](#))

70 Professor Chris Whitty, Chief Medical Officer for England ([Q249](#))

71 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q78](#))

72 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1039](#))

73 Oral evidence taken before the Joint Committee on the National Security Strategy on 19 October 2020, ([Q44](#))

74 Written evidence submitted by Professor Robert MacKay, Director of Mathematical Interdisciplinary Research, University of Warwick ([C190027](#))

Groups contributing to SPI-M will all independently go away and try to answer those questions and come back often two days or three days later, after working all night, with our best estimate of the answer.⁷⁵

51. SAGE has been activated for the longest continual period since its inception, which brings to question how sustainably the group can maintain its current level of high activity. We acknowledge senior scientists' comments of frequent working round the clock, and we pay tribute to their continued service to the public throughout this emergency. It is also important to be clear that it is not just the participants of SAGE, and its sub-groups, who are managing this workload—it is shared by the colleagues, junior researchers and technicians who support them, too, as well as Government officials, among others. *The Cabinet Office and the Government Office for Science should commit to update SAGE guidance to consider what support might be required for independent advisers in long-term emergency scenarios, within six months of SAGE being deactivated. The Government should identify a way to formally recognise and celebrate all those who have contributed to the UK scientific response to the pandemic.*

75 Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London ([Q894](#))

4 Transparency and communication

52. The strength of British science and the prominent role that scientific advice has played during the pandemic has been an important source of public information and confidence. The regular appearances of the GCSA and CMO at Downing Street press conferences have been a public demonstration that scientific advice has been influential in Government decisions. However, a central concern of this Committee from the beginning of the pandemic has been the initial lack of transparency of the science advice being utilised by the Government, and those individuals and bodies responsible for giving it. The concern around transparency has also been shared by eminent scientists and institutions, as summarised by the Francis Crick Institute in written evidence: “with scientists sharing the stage with politicians, there is a need for clear accountability, clarity about the governance arrangements and the demarcation of advisory versus decision-making roles.”⁷⁶ In this Chapter we explore issues relating to transparency.

Disclosure of science advisers and SAGE participants

53. Early in the pandemic, we called for transparency of the experts attending SAGE and the disciplines represented therein, putting our request to the Government Chief Scientific Adviser, Sir Patrick Vallance, in our first public hearing and in a subsequent follow-up letter.⁷⁷ Aside from the public confidence that is inspired through transparency in decision-making, our purpose in this request has been in the spirit of supporting robust decisions. Transparency around scientific advice enables scrutiny and constructive appraisal from the wider scientific community, to ensure that decisions made are based in as wide and appropriate a range of disciplines and perspectives as necessary.

54. Sir Patrick Vallance responded to our initial request in early April to explain that the initial lack of disclosure of SAGE participants was due to advice from the Centre for the Protection of National Infrastructure (CPNI), which was “in line with the standard procedure for COBR meetings”.⁷⁸ Sir Patrick indicated that this advice concerned “safeguarding individual members’ personal security and protect[ing] them from lobbying and other forms of unwanted influence which may hinder their ability to give impartial advice”. SAGE’s co-chair, Professor Chris Whitty, reiterated this to us in oral evidence in April but suggested that the advice from CPNI was not applicable although it “needed to be thought through quite carefully”:

We were given quite clear advice from the Centre for the Protection of National Infrastructure based on the fact that SAGE is a sub-committee of Cobra and meets in a range of circumstances, some of which are very much security related. This is not. [...] There is absolutely no barrier from me or from Sir Patrick in principle.⁷⁹

76 Written evidence submitted by the Francis Crick Institute ([C190072](#))

77 (i) Rt Hon Greg Clark MP, Chair, Science and Technology Committee ([Qq75–76](#)); (ii) [Correspondence from the Chair to Sir Patrick Vallance, Chief Scientific Adviser, relating to SAGE Membership](#), 30 March 2020

78 [Letter from Sir Patrick Vallance to the Chair of the Committee on SAGE composition](#) dated 4 April 2020

79 Professor Chris Whitty, Chief Medical Officer for England ([Q301](#))

55. Details of the advisers participating in SAGE, and its sub-groups, were first published on 4 May, over one month after lockdown measures were instigated and over three months after SAGE first met.⁸⁰ It is also worth noting that the SAGE publication scheme, dated 29 May, indicated that some information would be redacted to “protect the personal data of individuals” including junior Government officials and SAGE participants who asked specifically not to be named.⁸¹ We welcomed this important step towards transparency and accountability in our letter to the Prime Minister in May,⁸² however we noted then that there was a lack of clarity between those experts who had formed the ‘core’ of SAGE participants and those advisers who were invited to only a few meetings—as Professor Sir David Spiegelhalter brought to our attention.⁸³

56. Whilst we welcome the eventual disclosure of SAGE participants, the fact that the delay was attributed to advice from the Centre for the Protection of National Infrastructure (CPNI) gives us cause for concern. As suggested by Professor Chris Whitty, the advice relates to emergencies relevant to national security rather than public health crises. We therefore conclude that it was not necessary for CPNI advice to have resulted in a delay in the public disclosure of SAGE participants of over three months. *Within three months of this Report, the Cabinet Office should update SAGE guidance to stipulate the timeframes in which SAGE should receive advice from the Centre for the Protection of National Infrastructure, and other relevant bodies, regarding the public disclosure of expert SAGE participants.*

57. Regarding the disclosure of Government officials observing SAGE meetings, we agree with the redaction of information to protect the personal data of individuals including junior officials at the time of the emergency. In the interests of transparency, and to have a full picture of who is formulating policy advice to Government during the course of the pandemic, it is important that the identities of senior officials and political advisers attending SAGE meetings are made public. We also note that the minutes of previous SAGEs activated for other emergencies were eventually published with full disclosure of all participants and observers. *In response to this Report, the Government should commit to the full disclosure of the following information on SAGE attendees and observers throughout the pandemic:*

- (1) *Civil servants at Senior Civil Service grade;*
- (2) *political and special advisers; and*
- (3) *the representative Government departments and job title of junior officials, in lieu of their names.*

Further, the Government should commit to the full disclosure of all individuals who attended SAGE meetings—and their affiliations—within three months of the current SAGE being stood down, or by the end of 2021, whichever is the earlier.

80 GOV.UK, [List of participants of SAGE and related sub-groups](#), accessed 12 October 2020

81 GOV.UK, [SAGE: Coronavirus response - publication scheme](#), 29 May 2020

82 [Correspondence from Chair to the Prime Minister regarding lessons learned so far from the covid-19 pandemic](#), 18 May 2020

83 Professor Sir David Spiegelhalter, Chair, Winton Centre for Risk and Evidence Communication, University of Cambridge ([Q468](#))

Other advisory groups

58. We note that in the early stages of the pandemic, the membership of other advisory groups was not made public in a consistent manner. While the membership of the New and Emerging Respiratory Virus Threats Advisory Group has remained public throughout, the membership of the Scientific Pandemic Influenza Group on Modelling (SPI-M) was public knowledge leading up to the covid-19 pandemic,⁸⁴ but was hidden at the height of its initial spread throughout the UK⁸⁵ and remained so until the list of SAGE participants was made public on 4 May 2020.⁸⁶ Further, the membership of the then Scientific Pandemic Influenza Group on Behaviours (SPI-B) remained secret up until 4 May.

Joint Biosecurity Centre

59. With the establishment of the Joint Biosecurity Centre in June 2020, it was unclear initially how scientific expertise and advice would be utilised by the nascent organisation. A paper on the JBC considered at SAGE in May, and published in June, indicated that functions of the organisation would include monitoring and analysing the “numbers and pattern of cases and outbreaks of covid-19 nationally and locally in England and the Devolved Administrations” in addition to “deciding what responses are required”.⁸⁷ Further, the paper suggested that the JBC should “consider the different economic and social factors” that affect individuals’ behaviour in its analyses.

60. Information published towards the end of September on GOV.UK indicated an intent for the JBC to “build close partnerships with the academic and scientific community”,⁸⁸ further stating that such collaborations would “ensure that advanced mathematical and statistical models of the state of the epidemic in the UK are able to inform policy in an auditable and robust fashion.”

61. Speaking to us in early September, Dr Thomas Waite, Director of Health Protection at the JBC, gave us further insight into how the JBC would operate:

The idea behind JBC is to bring together experts from across Government. There are many epidemiologists, public health experts and so on in the national public health agencies of the UK, and we bring in data analysis skills, data science skills and data infrastructure skills to pull all that information together in a systematic fashion to help inform both local decision making and national decision making by the Secretary of State and so on.⁸⁹

62. In a letter to the Committee, dated 12 October, Baroness Harding, Interim Executive Chair of the new National Institute for Health Protection, explained that the JBC was “part of DHSC [...] and [was] not dissimilar to the many analytical divisions and directorates across government that provide insight to support policy making within government departments”.⁹⁰ She further stated that the JBC was “very different to SAGE, who are an advisory committee independent of government [...] [and] therefore does not produce meeting minutes in the same way as SAGE”.

84 GOV.UK, [Scientific Pandemic Influenza Group on Modelling](#) dated 24 July 2019

85 GOV.UK, [Scientific Pandemic Influenza Group on Modelling](#) dated 24 March 2020

86 GOV.UK, [List of participants of sage and related sub-groups](#), dated 4 May 2020 (NB SPI-B is now known as the Independent Scientific Pandemic Insights Group on Behaviours)

87 GOV.UK, [Note on Joint Biosecurity Centre and potential flows](#), 20 May 2020

88 UK Government, [Joint Biosecurity Centre](#), published 24 September 2020, accessed 6 October 2020

89 Dr Thomas Waite, Director of Health Protection, Joint Biosecurity Centre ([Q1276](#))

90 [Correspondence from Baroness Dido Harding to the Chair, regarding follow up evidence, 12 October 2020](#)

63. Nevertheless, the Government has indicated that the JBC had established a “technical board”, tasked with ensuring that “JBC products are of sufficient clinical and scientific rigour”, comprising the Chief Medical Officers and Chief Scientific Advisers of the four UK nations and “other relevant experts”. In addition, it was confirmed that a “data science advisory board” had been established to guide “the highest standards of reliability and reproducibility”.⁹¹ As of this Report, the Government has disclosed information on the experts that constitute these advisory boards and committed to publish the minutes of the data advisory board, the first of which were published in early December.⁹²

64. The paper considered by SAGE in May recommended that the JBC “should pursue a reputation as an organisation that the public can trust. This will require them to be an exemplar in terms of honesty, openness, competence and independence”. The paper stated that this was a “fundamental point” and “should be embedded into every level of the organisation and demonstrated to the public from day one.” **It is regrettable that full transparency was not achieved in time for the JBC’s inauguration on 1 June. We welcome the disclosure of the expert advisory boards supporting the JBC. Nevertheless, the Department of Health and Social Care (DHSC) has yet to commit to publish the outputs, including meeting papers and minutes, of all the JBC’s established boards. It would appear that the Government has not learned fully from the public concern resulting from the initial delays in publishing SAGE information. *The Department of Health and Social Care should commit, within a month of this Report, to publish the relevant outputs—including terms of reference, meeting papers and meeting minutes—of the steering and advisory boards supporting the JBC. DHSC should also set out how regularly these boards will meet and when relevant papers can be expected to be in the public domain—preferably within a fortnight of each meeting.***

Communicating science advice to Government decision-makers

65. Whilst it is crucial that science advice to Government is structured and coordinated well in emergencies, this effort is limited in value if the evidence is not communicated in a way that it can be most usefully considered alongside the many other factors that feed in to policymakers’ decisions.

66. Another important aspect is the delineation of advice and decision-making. Sir Patrick summarised his views for us in July:

Of course, the ultimate decisions are a mixture of policy and timing, which are not in our control [...] what I can be absolutely clear about is that those making policy and decisions have heard and understood the scientific advice [...] It is difficult to say, “Yes, that is based entirely on science advice,” because it is not; it is based on other things as well.⁹³

However, an alternate view was put to us by researchers at the University of Liverpool and University of Oxford, in relation to the initial interactions between expert advisers and Government officials:

91 UK Government, [Joint Biosecurity Centre](#), accessed 26 November 2020

92 UK Government, [Joint Biosecurity Centre](#), accessed 8 December 2020

93 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1040](#))

policy makers would say, “what should we do?” And [scientists] say “well what do you want to achieve?” And we just go round and round in circles [...] ‘Just going round in circles’ was the situation when policy makers only wanted to ‘follow the science’: things improved markedly once they had clear policy goals and began to seek scientific advice on the effectiveness of different ways to reach them.⁹⁴

The researchers also pointed to a more concerning conclusion:

some of our interviewees began to fear that Ministers were shifting the accountability for hard decisions onto them. A top Government advisor asked some of them: “what is it the PM has to say?” [...] and wrote it down—even to details, which the Prime Minister later used, like “you can’t go to the pub”.

67. Nevertheless, Sir Patrick assured us that the independent experts providing scientific advice had done so “freely and frankly”. When asked for examples of where Government decision-making had taken a different view to that put forward by advisers he commented:

it is not a straightforward yes or no [...] Clearly, if the Government had done something about which we said, “You should not do that,” we would stand up and say, “You absolutely should not do that, in our opinion, from the science”.⁹⁵

68. On occasion, scientific and medical advice to Government has informed the adoption of strict measures such as the second national lockdown order, which was announced by the Prime Minister on 31 October.⁹⁶ When we questioned the Government Chief Scientific Adviser and the Chief Medical Officer for England on whether the advice behind such measures was in practice “not optional”⁹⁷ because a prediction that the NHS would be overwhelmed could never be gainsaid, Professor Whitty responded that their advice did not go so far as to say “this is definitely going to happen on this date”:

People who give that degree of certainty have not understood how modelling of [covid-19 cases and NHS bed capacity] with scenario uncertainty properly works.⁹⁸

However, Professor Whitty further commented that:

the chances that things are likely somehow to improve without action between now and the next few months are quite low. If you are giving advice to Ministers, that has to be the advice you give. [...] Ministers then have to make decisions not just on that advice. They have to use multiple other things that have big social and economic impacts. [...] it is important that these deeply difficult societal measures fundamentally are decided by Ministers.⁹⁹

94 Written evidence submitted by the National Institute for Health Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections, University of Oxford, Nuffield Department of Primary Care Health Sciences, University of Liverpool, Institute of Infection and Global Health ([C190084](#))

95 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Qq1041–1042](#))

96 UK Government, [Prime Minister’s statement on coronavirus \(covid-19\)](#), 31 October 2020

97 Rt Hon Greg Clark MP, Chair, Science and Technology Committee ([Q1443](#))

98 Professor Chris Whitty, Chief Medical Officer for England ([Q1446](#))

99 Professor Chris Whitty, Chief Medical Officer for England ([Q1446](#))

69. Given the frequent reporting of the views of SAGE advisers in the media—particularly where these have diverged from decisions taken by the Government—and the continued public interest in the evidence base underlying decisions made, we are satisfied for the most part that the demarcation between adviser and decision-maker has remained intact. If we are to fully understand the extent to which the Government has been guided by scientific and medical expertise, then we must see the science advice that is reflected in the papers and meeting minutes published by SAGE. This advice must also be taken in the context of other advice and evidence submitted to Government—only then will the full justification for the Government’s actions be understood. *The Government should publish the science advice given by the Government Chief Scientific Adviser and Chief Medical Officer for England to COBR and the Prime Minister to date, and commit to the disclosure of future SAGE advice within two months of it being given, or the policy being decided, whichever is the later.*

Transparency of evidence and advice to Government

70. Science advice is one facet of the wide array of inputs that have informed Government decisions throughout the pandemic. Government guidance on SAGE indicates that “transparency is an important element of democratic decision making and the evidence used to inform decision should be published.”¹⁰⁰ Explaining the importance of transparency in decision-making, the Nuffield Council on Bioethics highlighted that “governments must be transparent not only about the scientific evidence that they are taking into account, but also about the values and judgments that are inevitably involved in decision-making”. However, regarding the Government’s handling of the coronavirus pandemic, they cited a “concerning lack of transparency” in how scientific evidence fed into policy decisions.¹⁰¹ While SAGE sought faithfully to distil a central view, as in many areas of inquiry there is a range of views of scientists, as shown by the formation of groups such as that founded by a former Government Chief Scientific Adviser.¹⁰²

71. The need for transparency in communicating the scientific evidence considered by SAGE and Government decision-makers was made acute by reports in March that a single modelling report by the Imperial College covid-19 Response Team—led by Professor Neil Ferguson—had persuaded the Government to “change course” in its handling of the disease.¹⁰³ SAGE first began publishing the evidence it had considered on 20 March,¹⁰⁴ which notably listed the Imperial College report as the sole entry under “specific pieces of modelling on interventions provided to SAGE”.¹⁰⁵

72. The next substantial collection of SAGE evidence was published on 5 May—over one month after the initial evidence set—and the minutes of SAGE meetings began to be published from 29 May—four months after the group’s first meeting and over two months after the nationwide lockdown had been instigated.¹⁰⁶ When we wrote to the co-

100 UK Government, [Enhanced SAGE guidance](#), p.26, October 2012

101 Written evidence submitted by the Nuffield Council on Bioethics ([C190062](#))

102 Science magazine, [U.K. government should not keep scientific advice secret, former chief adviser says](#), 11 May 2020

103 BBC News, [Coronavirus: UK changes course amid death toll fears](#), 17 March 2020

104 GOV.UK, [Scientific evidence supporting the UK Government response](#), accessed 10 October 2020

105 GOV.UK, [Scientific Advisory Group for Emergencies \(SAGE\): Coronavirus \(covid-19\) response](#), dated 20 March 2020

106 GOV.UK, [Government publishes SAGE minutes](#), 29 May 2020

chairs of SAGE to inquire why a second delay had occurred,¹⁰⁷ we were told that the SAGE secretariat was processing a “very substantial volume” of evidence but that they aimed to “establish regular publishing cycles on an approximately monthly basis”.¹⁰⁸

73. With reference to the decision to publish evidence, Sir Patrick Vallance explained to us that previously SAGE had not published evidence until after the respective emergency had concluded, and so the decision to publish during the coronavirus pandemic required some consideration, leading to the delay:

It is important that we get the evidence out there. It took us a while to get it into the right shape to get it out there and get permission from people, because we were reliant on the papers you mentioned that had come from them and were attributed to them [...] That change to the way SAGE works is one that I personally welcome.¹⁰⁹

74. Professor Chris Whitty further explained that other operational considerations were a “huge pressure” facing the SAGE secretariat and much of the evidence considered by the group was at “a very early stage of development”:

In ordinary academic circumstances, you would not put them out until they had been peer-reviewed and brought into final form and, in many cases, got through a publication process. That has also provided delay in certain circumstances. As a scientist, I think that is right. We need to get things in an incredibly timely way in SAGE. On the other hand, we do not wish to put into the public domain stuff that has not yet got to the point where it has been properly completed and, ideally, peer-reviewed in the usual way for proper critique.¹¹⁰

Nevertheless, SAGE guidance stated that while the “most appropriate timing” for the publication of information was “often” after the emergency, the appropriate timing required consideration. The guidance also pointed out that one learning from the 2009 Swine flu pandemic was “the value of using experts to communicate key scientific and technical issues, as they were [publicly] perceived as trusted and credible sources of information.”¹¹¹

Non-SAGE evidence and advice

75. Public understanding and scrutiny of Government decision-making is also dependent on the transparency of the entire evidence base underlying it. Speaking to us in early November, Sir Patrick reinforced the point that advice to Government is not solely scientific, telling us that SAGE “exists to provide the science advice” while “the Treasury and the Cabinet Office bring in the other parts of the equation, particularly on the economy”. He suggested, however, that while SAGE advice was “very clearly in the public domain”, the other advice drawn upon by the Government was “less visible”.¹¹²

107 [Correspondence from the Chair to Professor Chris Whitty, Chief Medical Officer, and Sir Patrick Vallance, Chief Scientific Adviser, relating to SAGE Publications](#), 20 April 2020

108 [Correspondence from Professor Chris Whitty, Chief Medical Officer, and Sir Patrick Vallance, Chief Scientific Adviser, relating to SAGE Publications](#), 23 April 2020

109 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q103](#))

110 Professor Chris Whitty, Chief Medical Officer for England ([Q297](#))

111 UK Government, [Enhanced SAGE guidance](#), p.26, October 2012

112 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1464](#))

76. At its fifty-eighth meeting on 21 September, SAGE noted the importance of economic assessments alongside scientific consensus:

All the [non-pharmaceutical] interventions considered have associated costs in terms of health and wellbeing and many interventions will affect the poorest members of society to a great extent. [...] Policy makers will need to consider analysis of economic impacts and the associated harms alongside this epidemiological assessment. This work is underway under the auspices of the Chief Economist.¹¹³

Despite that, speaking to the Treasury Committee on 11 November, Clare Lombardelli, the Chief Economic Adviser at HM Treasury, said that the Treasury had “not done a specific prediction or forecast of the restrictions” but rather provided an “ongoing analysis” of economic factors:

What we instead do is iterative economic analysis of policy that the Government are considering. We consider a whole range of data and analysis as part of that. A lot of that is in the public domain, as you would expect. We look at, for example, what has happened to the economy over the recent period.¹¹⁴

77. On 30 November, the Government published its *analysis of the health, economic and social effects of covid-19 and the approach to tiering*,¹¹⁵ ahead of a motion in the House of Commons to approve further Regulations on 1 December.¹¹⁶ The analysis referred to three broad scenarios, projected by the Office for Budget Responsibility, for how the coronavirus might impact the UK economy.¹¹⁷ However, the analysis also indicated that no attempt had been made to estimate the economic impacts of specific interventions as such analysis would involve “such wide uncertainty as to not be meaningful for precise policy making.”¹¹⁸

Communicating science advice to the public

Government communications

78. We note that from the outset, the Government has sought to emphasise the medical and scientific advice that has informed its response to the coronavirus, particularly through the widely televised press conferences at Number 10.¹¹⁹ Nevertheless, communicating science advice to the public requires some careful forethought, with an appreciation of the wider context in which policy decisions are made. As Health Secretary Matt Hancock MP stressed to us in July:

113 GOV.UK, [Fifty-eighth SAGE meeting](#), 21 September 2020

114 Oral evidence taken before the Treasury Committee on 11 November 2020, HC 969 (Q3)

115 UK Government, [Analysis of the health, economic and social effects of covid-19 and the approach to tiering](#), 30 November 2020

116 HC Deb, [Public Health](#), 1 December 2020

117 UK Government, [Analysis of the health, economic and social effects of covid-19 and the approach to tiering](#), p.28, 30 November 2020

118 UK Government, [Analysis of the health, economic and social effects of covid-19 and the approach to tiering](#), p.28, 30 November 2020. p10

119 UK Government, [Prime Minister's statements on coronavirus](#), retrieved 25 November 2020

I always argue that we are guided by the science, because you take into account the scientific evidence and then you also take into account everything else. The key feature of how that works is that SAGE is a body that advises the CMO and the CSA and they, in turn, advise Ministers. Whether that is through COBRA or the Covid-O structure that we have now, the advice from SAGE comes to us and comes to me as Health Secretary through the CMO and the scientific advice through the CSA, and they also take into account wider considerations in that advice. I then take into account all the considerations in the official policy advice that I get from the civil service.¹²⁰

Nevertheless, a significant number of scientists, research institutions and scientific organisations wrote to us to express their concerns that the boundary between science advice and decision-making has not been communicated effectively. These concerns have coalesced in particular around the use of the phrase ‘following the science’, as exemplified by comments from the Royal Society that “considering science advice is not the same as simply ‘following the science’” (see conclusion at paragraph 69).¹²¹

79. The presentation of data and statistics around the pandemic has been an active area of interest in our work (see Box 1). The line between advice and decision-making was tested when the Prime Minister announced plans for a second ‘stay at home’ order on 31 October.¹²² Although the Chief Medical Officer and Government Chief Scientific Adviser presented modelling data at the press conference alongside the Prime Minister, the data underlying this was only made public three days later and was subject to extensive criticism, including that the data was out-of-date.¹²³ For example, on 5 November Ed Humpherson, Director General for Regulation at the Office for Statistics Regulation, wrote to Sir Patrick Vallance to caution that the lack of transparent and timely information carried the “potential to confuse the public and undermine confidence in the statistics.”¹²⁴ When we raised the issue of the potential for this data, and how it was presented, to confuse those without scientific backgrounds, Sir Patrick explained that it was “certainly not the aim” but that it was difficult to convey what might happen.¹²⁵

80. Nevertheless, speaking more generally, Professor Sir Ian Diamond, the National Statistician, indicated to us in May that the Office for National Statistics (ONS) had officials “embedded in Government communications” to ensure that graphs and figures presented by the Government were “statistically sound”, suggesting that “over time we have seen an improvement” in communication.¹²⁶

120 Matt Hancock MP, Secretary of State for Health and Social Care ([Q1189](#))

121 Written evidence submitted by the Royal Society ([C190110](#))

122 UK Government, [Prime Minister’s statement on coronavirus \(covid-19\)](#), 31 October 2020

123 UK Government, [Slides and datasets to accompany coronavirus press conference](#), 31 October 2020, retrieved 27 November 2020

124 [Correspondence from Ed Humpherson to Sir Patrick Vallance regarding transparency of data related to COVID-19](#), 5 November 2020

125 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1462](#))

126 Professor Sir Ian Diamond, National Statistician ([Q434](#))

Box 1—Government reporting of death statistics

Professor Chris Whitty outlined to us in April that there were “four forms” of health impacts from covid-19:

There are direct deaths from Covid with the NHS working well. There are indirect deaths because of the NHS becoming overwhelmed [...] The third one is indirect deaths caused by downscaling other public health services [...] The final one [...] is that we all know there is a gradient between health and deprivation [...] that will have a health effect.¹²⁷

The reporting of death statistics has evolved throughout the pandemic. Before 29 April, the Department of Health and Social Care (DHSC) reported only deaths in hospitals from those with a positive covid-19 test.¹²⁸ On 29 April, a “new method” of reporting daily deaths was announced to include “deaths that have occurred in all settings” where an individual had tested positive for covid-19.¹²⁹ The Government’s reporting of death statistics changed again in August—following an “urgent” review by Public Health England—to count deaths within 28 days of a positive covid-19 test.¹³⁰ This followed “concerns raised by academics from the Centre for Evidence-Based Medicine about the original measure, which counted anyone who had ever tested positive as a covid-associated death.”¹³¹

Professor Sir David Spiegelhalter, Chair of the Winton Centre for Risk and Evidence Communication at University of Cambridge, suggested to us in May that the early reporting of hospital deaths alone had been “really inadequate” prior to being “upgraded”.¹³² Nevertheless, he pointed out that DHSC-reported data left out those “who died of covid who had not been tested”, but noted that this was addressed in data from the Office for National Statistics (ONS).¹³³ Professor Spiegelhalter indicated that the efforts of the ONS to produce new data and analyses had been an “extraordinary achievement”.¹³⁴

81. Several of the epidemiological modelling experts, including Professor Neil Ferguson, who fed into central Government decision-making said to us that “more certainly could be done” to communicate information to the public, but that there were practical limitations.¹³⁵ Professor Matt Keeling from the University of Warwick told us that:

we are all really interested in public communication of science. When you are working 24-hour days to try to get models up and running and you have teams running in parallel, you just do not have time to do public communication as well. Maybe this is a lesson for the future that we need to do more public communication beforehand.¹³⁶

127 Professor Chris Whitty, Chief Medical Officer for England ([Q306](#))

128 Office for National Statistics, [The different uses of figures on deaths related to COVID-19 published by DHSC and the ONS](#), accessed 8 December 2020

129 GOV.UK, [Daily death reporting now includes all positive COVID-19 deaths](#), 29 April 2020

130 GOV.UK, [New UK-wide methodology agreed to record COVID-19 deaths](#), 12 August 2020

131 GOV.UK, [New UK-wide methodology agreed to record COVID-19 deaths](#), 12 August 2020

132 Professor Sir David Spiegelhalter, Chair of the Winton Centre for Risk and Evidence Communication, University of Cambridge ([Q481](#))

133 Professor Sir David Spiegelhalter, Chair of the Winton Centre for Risk and Evidence Communication, University of Cambridge ([Q481](#))

134 Professor Sir David Spiegelhalter, Chair of the Winton Centre for Risk and Evidence Communication, University of Cambridge ([Q482](#))

135 Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London ([Q932](#))

136 Professor Matt Keeling, Professor of Mathematics and Life Sciences, University of Warwick ([Q933](#))

82. Nevertheless, written evidence submitted by UK Research and Innovation (UKRI) suggested that public opinion of science advice had remained strong. UKRI told us that “overall, the public want more scientific information on covid-19 – just 13 percent say there is too much”,¹³⁷ based on polling conducted by Ipsos MORI that also indicated that 58% of the adults surveyed believed the scientists advising on covid-19 were trustworthy.¹³⁸

General science communication

83. A number of written evidence submissions pointed to the significant efforts of the wider scientific community—including non-departmental public bodies—in engaging with the public to communicate scientific topics as clearly as possible. For example, UKRI pointed to their efforts in launching a “coronavirus explained website” in March to “provide authoritative and up-to-date explanations of the scientific evidence behind the covid-19 pandemic to the UK public”.¹³⁹ Further, the Health Research Authority (HRA), a regulator of health and social care research, told us that it had “established a process where we publish the summary of all covid-19 [clinical] research within three days of approval.” The Association of the British Pharmaceutical Industry (ABPI) was “supportive” of the HRA’s efforts to make such “lay summaries” freely available.¹⁴⁰ Outside of official channels, the Institute of Development Studies said that “some of the most effective forms of communication and support around covid-19 are grassroots solutions being generated through digital platforms e.g. local Facebook groups” and that “sharing of visual representations of data via digital platforms are also helping transcend linguistic barriers”.¹⁴¹

84. In relation to media reporting of scientific research into covid-19, we understand that a tension exists between presenting information that is scientifically robust and that which is up to date. This issue is reflected in our discussion on the decision to publish the evidence used by SAGE (see paragraph 74), and is further outlined in written evidence supplied to us by the British Pharmacological Society:

Prior to the pandemic, this was not common practice as pre-prints were not a focus of the general media. Clearly it is important to be open and transparent about research and ensure its findings are available to all as soon as possible. However, it is also important to stress that these pre-prints were not peer-reviewed and therefore need to be assessed critically rather than taken at face value. Consequently, as journalists have been keen to report on these non-peer-reviewed studies, balanced comment from experts has been necessary - even if to make the point that a study is inconclusive, and more research is needed. Finally, even the peer-reviewed literature base will create conflicting evidence that is not always easy interpret when it comes to informing future research. Communicating emerging research must be done with an appreciation of the inherent uncertainty associated with scientific research.¹⁴²

137 Written evidence submitted by UK Research and Innovation ([C190073](#))

138 Ipsos MORI, [UKRI Research: How has covid-19 affected trust in scientists?](#), 22 September 2020

139 (i) Written evidence submitted by UK Research and Innovation ([C190073](#)); (ii) UK Research and Innovation, [Coronavirus: the science explained](#), accessed 4 December 2020

140 Written evidence submitted by the Health Research Authority ([C190096](#)) and the Association of the British Pharmaceutical Industry ([C190098](#))

141 Written evidence submitted by the Institute of Development Studies ([C190089](#))

142 Written evidence submitted by the British Pharmacological Society ([C190075](#))

85. The balanced reporting of new, non-peer-reviewed research involves active participation of the academic community in public discourse. The Royal Society of Edinburgh told us that there was “a need for active promotion of experts to the media by science organisations” to “ensure the coordination and rapid mobilisation of scientific commentary from reputable and responsible experts”.¹⁴³

86. **Transparency in the evidence behind Government decisions enables higher quality decision-making through scrutiny, and better understanding of the reasons for those decisions.** While calls for the publication of SAGE evidence from this Committee and many others were eventually heeded, it is regrettable that a significant amount of time passed before a regular publication rhythm was established. However, we acknowledge that in emergencies, where evidence is subject to great uncertainty, careful thought must be given to the way information is communicated and presented, given the context at the time. During those crucial early weeks of the pandemic—in which important decisions were made by the Government—public understanding and scrutiny was hampered by a lack of transparency. For example, when details of the 16 March Imperial College report were made public, it was not known what other evidence was being considered by SAGE and the Government. It is regrettable that a repeat of this scenario occurred on 31 October, ahead of the second national lockdown in England, where there was a delay in publishing the data behind the modelling used by SAGE. Presenting a graph to the public including a scenario of 4,000 deaths per day—based on out-of-date information and without a clearly marked source—risked, as indicated by the Office for Statistics Regulation, causing public confusion and undermining confidence in the statistics, and in our view, causing public alarm beyond what was justified. We agree with the assessment of the Office for Statistics Regulation and urge the Government and its advisers to ensure that analysis selected for public presentation meets high standards of rigour and relevance.

87. It has been made clear to us that policy decisions throughout the coronavirus pandemic have not been based solely on medical and epidemiological science, but rather have been developed with a wide range of inputs that include scientific research and opinion. Nevertheless, as indicated by the Government Chief Scientific Adviser, while the scientific analysis informing the Government’s interventions has enjoyed a great level of public exposure, the analysis and advice outside of SAGE (including economic and social considerations) have been “less visible”. It is disappointing that the Treasury had “not done a specific prediction or forecast of the restrictions” implemented, or those not pursued, but rather provided an “ongoing analysis” of economic factors, despite SAGE indicating that social and economic impacts should factor into such decisions. It is understandable that these analyses are subject to significant uncertainty, however by analogy the epidemiological modelling published by SAGE, too, is uncertain and should not to be interpreted as a strict predictor of what will happen. *The Government should, as a matter of urgency, publish the advice it has received on the potential indirect covid-19 impacts (e.g. economic, social and other health impacts) of the interventions it has undertaken, alongside the evidence base for that advice and should continue to commission such research.*

143 Written evidence submitted by the Royal Society of Edinburgh ([C190103](#))

88. *The public has shown a strong appetite for more information. The Government should attempt to quantify the four forms of health impacts identified by Professor Whitty. Further, it should consider whether it is possible to provide an analysis of—either consistently or on a sample basis—those who died with covid-19 as distinct from those who died from covid-19.*

89. As indicated by the Chief Medical Officer for England, the SAGE secretariat faced “huge pressure” in managing the monumental task of organising SAGE whilst adhering to the principles of transparent and scrutable scientific advice. We commend the efforts of officials in the Government Office for Science, the SAGE secretariat and independent advisers in their efforts to establish a regular rhythm of publicly available information, and hope that this is taken forward as a key learning for future emergencies. *The Cabinet Office should work alongside the Government Office for Science to update SAGE guidance to incorporate the lessons learned for managing transparency during emergencies, taking account of:*

- a) *the potential volume of information;*
- b) *the publication and communication of non-peer-reviewed research informing SAGE;*
- c) *the potential length of time over which SAGE is activated; and*
- d) *the potential impacts on public trust.*

90. We applaud the dedication with which the scientific community within the UK and globally have directly engaged with the public, in addition to their intensive studies of the coronavirus itself. We are also grateful to those within universities and research institutes for their efforts in supporting the clear and direct communication of the science of covid-19. These efforts have helped ensure that the trust of the British public in the strength of independent science advice has remained high during the pandemic, and we hope that these efforts are supported so that they may continue. We note, however, that a balance needs to be achieved so that Government decisions are not seen to be entirely science-led. *The Government Office for Science should work with Government departments and public bodies, such as UK Research and Innovation, to identify the lessons to be learned from the Government’s communication of science—drawing also upon the experiences of researchers and their respective institutions. These lessons should be reflected within updated SAGE guidance, including a consideration of the support that SAGE participants may require for effective public communication and engagement during emergencies.*

5 Nature of the scientific advice to Government

91. Having examined different aspects of the science advisory process earlier in this Report, this Chapter considers the main issues around the nature of the scientific advice drawn upon by the Government in the early stages of its management of the coronavirus pandemic. One key aspect of this has been the breadth of expertise represented at SAGE meetings and in other scientific advisory groups. This is in part why we called for the disclosure of information on scientific advisers throughout the early stages of pandemic.

Initial breadth of scientific expertise

92. When the Government Chief Scientific Adviser and the Chief Medical Officer for England wrote to us in early April to give an overview of the expertise feeding into SAGE, they explained that a range of areas of expertise were represented on SAGE: “molecular evolution, epidemiology, clinical science and practice, modelling emerging infectious diseases, behavioural science, statistics, virology and microbiology”.¹⁴⁴ However, several witnesses have suggested that there was a heavy emphasis on epidemiology and modelling in the science advice relayed to central Government. For example, Professor Johan Giesecke, Former State Epidemiologist for Sweden and Professor Emeritus at Karolinska Institute, suggested that “epidemiologists and modellers had too great a power” in both the UK and Sweden in the early phase of the pandemic.”¹⁴⁵

93. We further note public comments made by Professor Mark Woolhouse, one of the key epidemiologists advising SPI-M and the Scottish Government covid-19 Advisory Group, that he thought “scientific advice [was] driven far too much by epidemiology”.¹⁴⁶ Speaking to us in June, Professor Woolhouse provided further clarification that:

In the early stages of the epidemic, before we had large amounts of [public health] data, [advice] was largely on the basis of modelling, and that is all right and proper and as it should be, but we are looking literally at only one side of the equation when we do that.¹⁴⁷

He suggested that the “other side” of the equation included “the harms done by lockdown” including impacts on “mental health and social wellbeing, the education of our children and our economy.”¹⁴⁸ Nevertheless, Professor Neil Ferguson—another eminent scientific adviser involved in modelling the pandemic—suggested to us in the same meeting that SAGE’s approach had “evolved over time quite a lot” and was “a lot more diverse”.¹⁴⁹ He stated further that “modelling has an important role to play, but clearly it is just one of many scientific inputs.”

144 [Letter from Sir Patrick Vallance to the Chair of the Committee on SAGE composition](#) dated 4 April 2020

145 Professor Johan Giesecke, Former State Epidemiologist for Sweden and Professor Emeritus at Karolinska Institute ([Q828](#))

146 The Guardian, [Scientists criticise UK government’s ‘following the science’ claim](#), 23 April 2020

147 Professor Mark Woolhouse, Professor of Infectious Disease Epidemiology, University of Edinburgh ([Q823](#))

148 Professor Mark Woolhouse, Professor of Infectious Disease Epidemiology, University of Edinburgh ([Q823](#))

149 Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London ([Q935](#))

Multi-disciplinary advice

94. Aside from the disciplines discussed above, we have received a notable amount of written evidence regarding a perceived lack of representation across other relevant Science, Technology, Engineering, Maths and Medicine (STEMM) fields of study. For example, some of the viewpoints expressed to us include that:

- a) public health science had been “underutilised”;¹⁵⁰
- b) there were “concerns around the representation of immunology expertise”;¹⁵¹
- c) there was “room to enhance” the use of engineering expertise and advice;¹⁵²
- d) early in the pandemic there was a “lack of involvement of established coronavirusologists who might have been able to grasp more quickly the potentially complex symptomology, immuno-pathology and epidemiology of the virus”;¹⁵³ and
- e) the “government itself could have done better in listening to and responding to, needs and alternative views outside of ‘Golden Triangle’ Universities”.¹⁵⁴

In March, Dr Richard Horton expressed his concern to us that there was an apparent lack of public health and clinical input into SAGE.¹⁵⁵ However, Sir Patrick Vallance robustly rejected the suggestion that SAGE did not have sufficient clinical representation:

both the Government chief scientific adviser—me—and of course the CMO are medics. We also have the NHS medical director on SAGE itself. We have a number of clinicians around the table, including some from Public Health England, so quite a proportion of SAGE is clinical, but—it is an important “but”—there is a clinical subgroup within SAGE and they are all clinicians. They do a lot of the work on modelling the clinical aspects.¹⁵⁶

95. Further, evidence submitted by the Nuffield Council on Bioethics and the Institute of Development Studies discussed the importance of social science perspectives in informing decision making, with the latter stating that SAGE had “minimal social science representation and is largely confined to narrow behavioural science perspectives” which compared “unfavourably” with other European countries. The Institute also suggested that more expert input was required from the fields of “anthropology, geography, sociology, economics, history and related fields.”¹⁵⁷

96. However, speaking to our Committee and the Health and Social Care Committee in November, the Secretary of State for Health and Social Care suggested that criticisms that the diversity of SAGE expertise was too narrow were “not an accurate description”:

150 Written evidence submitted by the Academy of Medical Sciences ([C190102](#))

151 Written evidence submitted by the British Society for Immunology ([C190093](#))

152 Written evidence submitted by the Royal Academy of Engineering ([C190101](#))

153 Written evidence submitted by the Royal Society of Edinburgh ([C190103](#))

154 Institute for Life Sciences, University of Southampton ([C190071](#))

155 Dr Richard Horton, Editor-in-Chief of The Lancet ([Q40](#))

156 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q102](#))

157 Written evidence submitted by the Institute of Development Studies ([C190089](#)) and the Nuffield Council on Bioethics ([C190062](#))

we absolutely listen to a broad range of advice. The formal way in which the SAGE advice is brought to Ministers is, quite properly, through the CSA and the CMO. We listen very carefully to them. I also listen to all sorts of voices and scientific arguments.

The Secretary of State further commented that he did “not think that having engineers and operational skills and capabilities on SAGE would be right at all”, indicating that advice on engineering requirements was delivered “quite separately”.¹⁵⁸

97. We note that SAGE guidance indicated that “to ensure the full range of issues are considered advice needs to stem from a range of disciplines, including the scientific, technical, economic and legal”.¹⁵⁹ The provision of expert economics advice to Government throughout the pandemic is one issue that we have sought to understand, particularly given the wide ranging impact the coronavirus has had on the public as a whole and at the individual level. Professor Chris Whitty told us that SAGE was not giving economics advice to Government and did not have a “specific economic group”. He also suggested that SAGE was “not constituted” to give economics advice and would require a “different membership” in order to do so, cautioning that this could expand SAGE’s operation into “such a large group that it is almost impossible to do what it is currently doing.” However, Professor Whitty acknowledged that SAGE had one participant from Her Majesty’s Treasury (HMT)—later identified as the Director of Economics at HMT—who had fed in “important insights” due to her “different disciplinary and intellectual background”.¹⁶⁰ Speaking to whether the SAGE mechanism should be replicated for economics advice, Professor Whitty stated there was an “entirely legitimate question” but conceded that he did not believe he was “the right person to answer that”.¹⁶¹

98. However, speaking to us in November, Sir Patrick Vallance stated his viewpoint that economic analysis was “not something that takes place in SAGE, nor should it take place in SAGE”.¹⁶² He also pointed out that such analysis was taken elsewhere:

It is very clear that SAGE exists to provide the science advice. The Treasury and the Cabinet Office bring in the other parts of the equation, particularly on the economy. I do not think it is right to think that SAGE would be the place that you integrate all of this and come out with a single number.¹⁶³

We further note the evidence received in Chapter four, concerning the public communication of the economic advice given to Government (paragraphs 75–77).

99. Further, Philip Duffy, the Chief Scientific Adviser at HM Treasury, told us in May his view that the Treasury had “significant influence” on the questions put to SAGE for consideration, and described how HMT was kept up to date on economic impacts:

within the Treasury we have established broad governance to draw together our best understanding of the economic and market data but also of what is

158 Oral evidence taken before the Science and Technology Committee and the Health and Social Care Committee on 24 November 2020, HC 877 ([Qq517–521](#))

159 UK Government, [Enhanced SAGE guidance](#), p.5, October 2012

160 Professor Chris Whitty, Chief Medical Officer for England ([Qq303–305](#)). See also Philip Duffy, Director-General (Growth and Productivity) and Chief Scientific Adviser, HM Treasury ([Q789](#))

161 Professor Chris Whitty, Chief Medical Officer for England ([Q306](#))

162 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1466](#))

163 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1464](#))

happening with the epidemic. I chair a sub-board of that committee, which looks at the impact on businesses and companies. The third area that has been an absolute priority for the Treasury is to lay its hands as quickly as possible on as much realtime data [...] we have a very broad realtime dataset that can support the Chancellor and Prime Minister in the decisions they have had to take over the last few months.¹⁶⁴

Mr Duffy also told us he was “nervous” about the suggestion of creating “some form of economic SAGE or a social policy SAGE, or some kind of allied group that would look at the broader issues” as ministerial decisions had been made with “a combination of the best science that we can find and our best analysis of the social, economic and political consequences of those choices”. He also expressed that he was “sceptical of the notion that a few extra economists would somehow accelerate answers or give us a sense of rigour around some of those choices.”¹⁶⁵

100. We believe that a gap persists in the transparency of the advice that is given to the Government, outside of the auspices of SAGE, particularly on the topic of non-medical impacts of the pandemic and related Government interventions. While this Committee is not advocating the establishment of an “economics SAGE”, we do note that SAGE’s remit covers the inclusion of numerous disciplines, including “scientific, technical, economic and legal” expertise. Further, it is entirely within the gift of SAGE to establish sub-groups to draw in other expertise as necessary. Whilst we have been assured that a Treasury official has been present at SAGE meetings, it has been stressed to us that SAGE does not issue economic advice and thus such advice must be received by Government through other avenues. *The Government must, in response to this Report, set out how advice to central Government on the indirect effects (for instance impacts on mental health and social wellbeing, education and the economy) of covid-19, and the Government’s policy response to it, has been structured throughout the pandemic, and commit to the public disclosure of the individuals and institutions from which it has sought such advice and publication of relevant papers.*

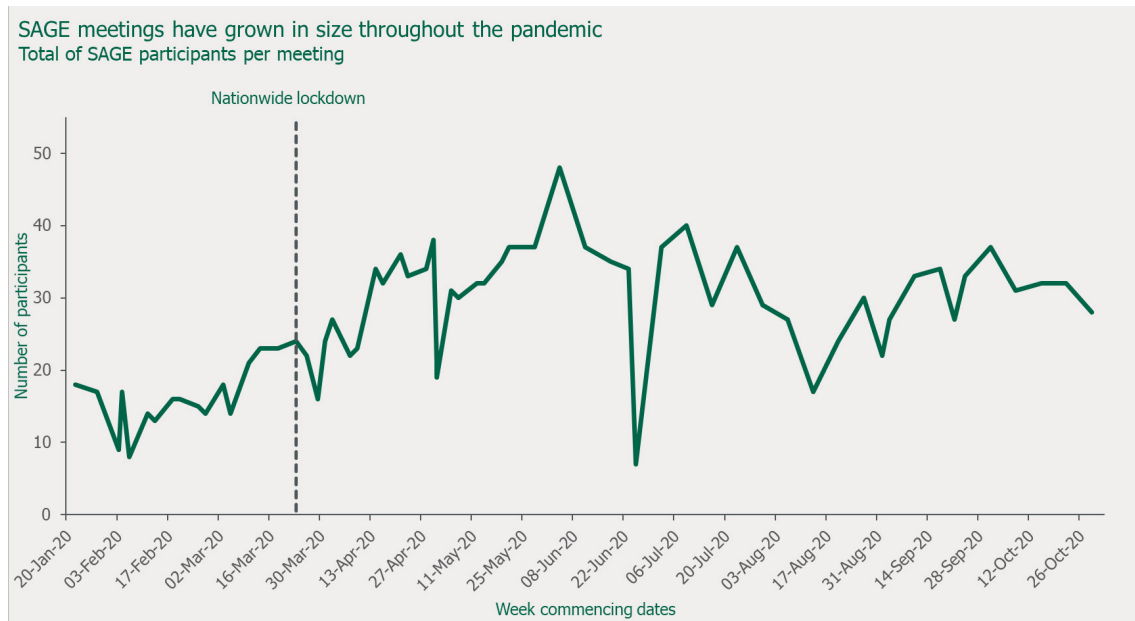
Our analysis of SAGE meetings

101. The disclosure of the minutes of SAGE meetings, beginning in May, has enabled us to analyse how the number of experts who attended SAGE meetings has evolved throughout the pandemic.¹⁶⁶ Our analysis has focused on minutes published by SAGE, covering meetings in the period of 22 January—29 October, spanning the initial spread of the coronavirus in the UK, the first nationwide lockdown and the period leading up to the second nationwide lockdown in England. In general, SAGE meetings have increased in size throughout the pandemic, with the first thirteen meetings comprising under 20 participants before steadily growing throughout the first nationwide lockdown to often include in excess of 30 individuals (Figure 2).

164 Philip Duffy, Director-General (Growth and Productivity) and Chief Scientific Adviser, HM Treasury ([Qq788–792](#))

165 Philip Duffy, Director-General (Growth and Productivity) and Chief Scientific Adviser, HM Treasury ([Qq788–792](#))

166 We have only included named participants from SAGE meetings, based on minutes available as of 14 December 2020. Individuals whose names have been redacted are omitted from this analysis.

Figure 2—Number of SAGE participants at each individual meeting

Source: GOV.UK. Notes: Individuals whose names have been redacted from SAGE minutes (as of 14 December 2020) are omitted from this analysis.

Access to data in the development of expert advice

102. According to a 2019 Royal Society report, there is “considerable strength in UK data science in academic, industrial, charitable and government sectors”.¹⁶⁷ Emphasising the importance of data in managing the coronavirus, Sir Patrick Vallance told us that:

One lesson that is very important to learn from this pandemic, and for emergencies in general, is that data flows and data systems are incredibly important. You need the information in order to be able to make the decisions. Therefore, for any emergency situation those data systems need to be in place up front to be able to give the information to make the analysis and make the decisions.¹⁶⁸

Sir Patrick indicated that this was not limited to testing data but also encompassed “basic information flows around patients in hospital, rates of admission and rates of movement”. However, he suggested that a principal issue in managing the pandemic was that “at the beginning there were definitely times when we would have liked data that was difficult to get”. While he stated that “data flows are getting much better now”, he pointed out that the NHS “does not have centralised data flows on everything you need”.¹⁶⁹

103. Sir Patrick later wrote to us reinforce his view that in the “first weeks of the UK’s epidemic, it was difficult for SAGE to accurately assess the state and trajectory of the outbreak at that time due to the lack of data” pointing to specific issues including:

¹⁶⁷ The Royal Society, [Dynamics of data science skills](#), May 2019

¹⁶⁸ Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1043](#))

¹⁶⁹ Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Qq1045–1047](#))

- a) that it took until mid-February for the “relevant data sharing agreements [to be] signed by modelling groups”, with the first detailed PHE “line list data” being provided to modellers on 6 March;
- b) that initially “not all SPI-M modelling groups were able to access” data from NHS England and that early data “lacked granular detail, such as how many patients were new covid-19 admissions, versus potential re-admissions”; and
- c) that “comprehensive data on covid-19 in care homes were not available to the Government”.¹⁷⁰

104. A SAGE meeting on 15 March demonstrated the impact of poor data management in the understanding of the disease at the most critical time for the UK:

Owing to a 5–7 day lag in data provision for modelling, SAGE now believes there are more cases in the UK than SAGE previously expected at this point, and we may therefore be further ahead on the epidemic curve.¹⁷¹

We note that while more data eventually became available through initiatives such as the Office for National Statistics (ONS) infection survey,¹⁷² the National Statistician, Professor Sir Ian Diamond, pointed out that the ONS “responded to the first request [they] got” from the Government on 17 April. Nevertheless, Sir Ian suggested that the response from the ONS—and partners—in initiating the work was rapid, stating that it was “one of the most rapid surveys I have ever in my life seen go into the field”.¹⁷³

105. The difficulties with accessing health data was also made clear to us by Professor Carol Propper, Professor of Economics and President of the Royal Economic Society:

There is scientific uncertainty and there is uncertainty within the social sciences and economics community [...] The more we can put these ideas together, the more we can get as much realtime data as possible and get health authorities to release health data, which is very difficult to do on a timely basis, the faster we can begin to analyse...It is all about having data and ideas and sharing both.¹⁷⁴

106. We also had several concerns outlined to us in written evidence, including that:

- a) problems occur “at every level, from data collection, curation, storage in accessible sharable formats, incentives for sharing, and a lack of competence in well-established ways of handling and sharing data that are compliant with regulations and address privacy concerns”;¹⁷⁵
- b) there has been “fragmentation of health data across various organisations such as NHS Digital, NHS England and Public Health England”, including “a lack of clarity on which organisations hold certain data and how to access data”;¹⁷⁶

170 Written evidence submitted by Sir Patrick Vallance ([C190111](#))

171 GOV.UK, [Fifteen SAGE meeting on covid-19 13 March 2020](#), published 29 May 2020

172 Office for National Statistics, [Infection Survey Pilot](#)

173 Professor Sir Ian Diamond, National Statistician, Office for National Statistics ([Q427](#))

174 Professor Carol Propper, Professor of Economics, Imperial College Business School ([Q781](#))

175 Written evidence submitted by the Royal Society ([C190110](#))

176 Written evidence submitted by the Wellcome Sanger Institute ([C190066](#))

- c) “the devolved nature of UK health systems and their differing legislation has made the combination of datasets difficult and has hampered the ability to carry out a UK-wide analysis”;¹⁷⁷ and
- d) the care sector suffers from “different systems collecting different data and a poor take up by the care homes and home care sector due to a lack of trust in the central and local authorities collecting the data”.¹⁷⁸

107. Professor Sylvia Richardson, Director of the MRC Biostatistics Unit and the then President-Elect of the Royal Statistical Society, also raised concern that the statistical community had been “hampered” in early efforts to access data and analyse the pandemic due to the lack of “a central core where all these data can be put together”.¹⁷⁹

108. The creation of the Joint Biosecurity Centre sought to provide such a centralised data hub, to enable faster, more integrated analysis and decision-making, as suggested by Professor Richardson who indicated that the JBC’s creation was an “extremely positive move”.¹⁸⁰

109. **Given the UK’s strengths in statistical analysis and data science, it is regrettable that poor data flows, delays in data-sharing agreements and a general lack of structuring and data integration across both the health and social care sectors have throttled timely data sharing and analysis. For example, it is unacceptable that detailed public health data was only made available to modellers from March. The potential consequences of this will undoubtedly include slower and less effective decision-making. The establishment of the Joint Biosecurity Centre as an effort to centralise data flows to manage the pandemic gives some hope, although it is unfortunate that no central mechanism to coordinate data was in place at the start of the pandemic. However it will only be successful in this mission if it learns from the issues encountered in the early stages of the pandemic, such as those raised to us by SAGE, representatives of the health and social care sector and the academic and research community. *In response to this Report, the Department of Health and Social Care (DHSC) should set out an action plan that describes what efforts have been made, and will be made during the pandemic, to address the poor data access issues raised by the scientific community and SAGE and its sub-groups, including a consideration of:***

- i) *agreements and incentives for data sharing;*
- ii) *integration of data flows across the health and social care sectors, including public health bodies at the national and local levels; and*
- iii) *integration of data flows across the health and social care systems of the four UK nations.*

DHSC should also describe what role the Joint Biosecurity Centre will be given to make best use of such data flows and outline what support it will receive to achieve this.

177 Written evidence submitted by the Wellcome Sanger Institute ([C190066](#))

178 Written evidence submitted by Care England ([C190021](#))

179 Professor Sylvia Richardson, Director, MRC Biostatistics Unit, University of Cambridge ([Q1280](#))

180 Professor Sylvia Richardson, Director, MRC Biostatistics Unit, University of Cambridge ([Q1281](#))

110. We are satisfied that the science advice informing the Government has drawn upon some of the best expertise that the UK—and indeed the world—has to offer. We acknowledge the initial dominance of modelling expertise on SAGE and believe this is a fair reflection of the lack of data at the beginning of the pandemic. We also note comments from the Secretary of State for Health and Social Care that SAGE expertise was broad enough and that advice from some disciplines—such as engineering—was given “quite separately”. We also appreciate that sub-groups and other advisory structures exist that may feed into Government decision-making, and that the composition of SAGE has evolved to incorporate a wider range of disciplines.

6 Application of science expertise

111. In this Chapter, we draw on a number of instances to consider how the advice and expertise of the science community has been applied across policy areas that have been important components of the UK Government's handling of the pandemic. We will return to these issues in more detail in future work.

112. One key question for consideration has been whether the UK's bespoke system for science and medical advice to Government has resulted in a different approach for the UK, as opposed to a scenario where WHO guidance was used explicitly, with national variance. Speaking to us and the Health and Social Care Select Committee in November, Professor Devi Sridhar, Chair of Global Public Health at the University of Edinburgh, suggested that following WHO advice would have been beneficial:

Q499 Greg Clark: [...] On reflection and for the future, in the context of a global pandemic, might we be more inclined to follow WHO advice than seek to have a bespoke UK system of advice?

Professor Sridhar: I think that is right. Having followed the press briefings and technical information since January, I think WHO advice has been pretty spot-on.¹⁸¹

Professor Sridhar further commented that there was a question of whether there was a “cleverer way out than other countries”. Giving examples, she stated that New Zealand had “pivoted” from a pandemic influenza-based plan, following a report of the WHO mission to China—led by Bruce Aylward—¹⁸² and indicated that Germany had “learnt” from the approach of mass testing and early treatment being adopted by the Republic of Korea.¹⁸³

Testing and contact tracing

113. We have been interested throughout the pandemic in the expert advice underlying the Government's approach to testing for covid-19 and contact tracing of potential new cases, encompassing both the capacity required to adequately capture the spread of the virus and the centralised approach that was adopted by the Government.

SAGE discussions

114. Sir Patrick Vallance, the Government Chief Scientific Adviser, assured us in March that “the first few meetings of SAGE were almost totally dominated by questions about contact tracing, containment, isolation and testing”.¹⁸⁴ From the outset the Government was aware that testing capacity issues could follow the spread of the coronavirus. For example, it was noted at the first SAGE meeting on 22 January that diagnostic testing capacity in Wuhan—the epicentre of the pandemic in China—had been “overwhelmed”, although at this stage it was perhaps uncertain if and how the virus would spread globally.¹⁸⁵

181 Oral evidence taken before the Science and Technology Committee and Health and Social Care Committee on 24 November 2020, HC877 (Q499)

182 For further information, please see [Report of the WHO-China Joint Mission on Coronavirus Disease 2019](#), 28 February 2020

183 Oral evidence taken before the Science and Technology Committee and Health and Social Care Committee on 24 November 2020, HC877 (Q499)

184 Sir Patrick Vallance, UK Government Chief Scientific Adviser (Q83)

185 UK Government, [Precautionary SAGE meeting](#), 22 January 2020

115. Nevertheless, SAGE's view of the UK's required testing capacity appears to have evolved. Although Professor Chris Whitty emphasised to us in April that SAGE had "consistently" called for a "greater capacity to test across the whole of the UK",¹⁸⁶ the minutes of SAGE's 22 January meeting—published on 29 May—concluded that the UK had "good centralised diagnostic capacity" for the novel coronavirus,¹⁸⁷ with the second SAGE meeting of 28 January noting that the UK had a capacity of "400 to 500 tests per day". However, by 4 February, SAGE noted that while "regional diagnostic capability" was being built "within weeks", overall capacity was "limited" and "cannot be substantially increased during this winter influenza season".¹⁸⁸

116. By the time of our first public hearing on 25 March, Sir Patrick Vallance shared his view that "the emphasis on ramping up testing is key" but suggested that that did not mean the UK was "slow in getting off the ground".¹⁸⁹ Professor Neil Ferguson of Imperial College London, similarly made it clear in March that "much more widespread testing" was required but explained that in the first few months it was "very clear from messages from Public Health England [PHE] that we would have nowhere near enough testing capacity".¹⁹⁰

117. As a result of low testing capacity in the face of the exponential growth in covid-19 around the UK, community testing was halted from 12 March to divert capacity for testing in healthcare settings.¹⁹¹ Sir Patrick Vallance described this as a "pragmatic reality" as there was "not enough testing" at the time.¹⁹²

118. Widespread contact tracing was also halted on 12 March, coinciding with the Government announcing a shift in strategy from 'contain' to 'delay'.¹⁹³ This was reflected in SAGE minutes from 18 February which noted that "when there is sustained transmission in the UK, contact tracing will no longer be useful".¹⁹⁴ The SAGE minutes also highlighted that, at the time, "PHE can cope with five new cases a week (requiring isolation of 800 contacts)" but that modelling suggested this capacity could be increased tenfold.¹⁹⁵ Professor John Newton, then national coordinator of the UK coronavirus testing programme, indicated to us in May that the decision to stand down contact tracing and testing was "a Government decision".¹⁹⁶ This was echoed by Professor John Edmunds, Professor of Infectious Disease Modelling, who suggested that decisions on contact tracing capacity were "operational" rather than "epidemiological", but noted that "if you leave the epidemic at a high level, and you have the same level of resources, those resources will not be sufficient to contain the epidemic".¹⁹⁷ Speaking to us in July, Sir Patrick Vallance indicated that "it was very difficult to scale [contact tracing] on the basis of what Public Health England was able to do at the time".¹⁹⁸

186 Professor Chris Whitty, Chief Medical Officer for England ([Q295](#))

187 UK Government, [Precautionary SAGE meeting](#), 22 January 2020

188 UK Government, [Fourth SAGE meeting](#), 4 February 2020

189 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Qq84–85](#))

190 Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London ([Q20](#))

191 GOV.UK, [Fifteenth SAGE meeting](#), 13 March 2020

192 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q84](#))

193 UK Government, [COVID-19: government announces moving out of contain phase and into delay](#), 12 March 2020

194 GOV.UK, [Eighth SAGE meeting on covid-19](#), 18 February 2020

195 GOV.UK, [Eighth SAGE meeting on covid-19](#), 18 February 2020, p.2

196 Professor John Newton, Director of Health Improvement, Public Health England ([Q640](#))

197 Professor John Edmunds, Professor of Infectious Disease Modelling, London School of Hygiene and Tropical Medicine ([Q456](#))

198 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1099](#))

119. The Government launched the NHS Test and Trace service on 28 May, in order to “help identify, contain and control coronavirus, reduce the spread of the virus and save lives.”¹⁹⁹ In the 2020 Spending Review—published on 25 November—the Government announced a total of £37 billion for “Test and Trace and Mass Screening” over the financial years 2020–21 and 2021–22.²⁰⁰ Nevertheless, a paper considered by SAGE in late September emphasised that while “an effective test, trace and isolate (TTI) system is important to reduce the incidence of infections in the community” it concluded that the current test and trace system was “having a marginal impact on transmission.”²⁰¹ When we discussed this with the CMO and GCSA in November, Professor Whitty implied that while contact tracing “will probably be having a bigger effect now” than earlier in the pandemic, it was clear that “even under perfect conditions, test and trace takes only a proportion of the R”.²⁰² Sir Patrick Vallance further commented that “even very effective test and trace systems do not work well at high prevalence.”²⁰³

120. In early December the National Audit Office (NAO) published its interim report *The Government’s approach to test and trace in England*, which concluded that NHS Test and Trace had an “unusual organisational relationship with the Department [of Health and Social Care], with unclear accountability”, potentially bringing “risks of confused decision-making.” The NAO report also indicated that while NHS Test and Trace “initially focused on increasing central capacity” for testing and tracing of cases and contacts, it had nevertheless “sought ongoing local engagement”.²⁰⁴ Correspondence from Baroness Harding—received as part of our *coronavirus: lessons learnt inquiry* with the Health and Social Care Committee—indicated that while £1.5 billion and £431 million had been spent on centralised testing and contact tracing respectively (up to and including September 2020), £312.5 million had been allocated to local authorities to cover “local test, trace and contain activities”.²⁰⁵

Capacity targets

121. On 2 April, Matt Hancock MP, the Secretary of State for Health and Social Care, announced a target of 100,000 tests per day by the end of that month,²⁰⁶ which was later clarified to us as comprising “swab tests that detect the presence of the virus”.²⁰⁷

122. The 100,000 test per day goal appears to have been set without direct advice from scientific advisers or public health officials. Speaking to us in April, Professor John Newton, then national coordinator of the UK covid-19 testing programme, suggested that the goal was “not a SAGE target” and that he was not aware where the Secretary of State for Health and Social Care, Matt Hancock MP, obtained advice in setting the

199 UK Government, [Government launches NHS Test and Trace service](#), 27 May 2020

200 UK Government, [Spending Review 2020](#), 25 November 2020

201 GOV.UK, [Summary of the effectiveness and harms of different non-pharmaceutical interventions](#), 21 September 2020

202 Professor Chris Whitty, Chief Medical Officer for England ([Q1487](#))

203 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1487](#))

204 National Audit Office, [The government’s approach to test and trace in England—interim report](#), December 2020

205 [Correspondence from Baroness Harding to the Chairs of the Science and Technology and Health and Social Care Committees](#), 20 November 2020

206 The Guardian, [Matt Hancock sets target of 100,000 coronavirus tests a day](#), 2 April 2020

207 Professor John Newton, Government advisor on increasing Covid-19 testing capacity ([Q191](#))

target.²⁰⁸ The detail of the goal was also uncertain, with Sir David Norgrove, Chair of the UK Statistics Authority, urging the Secretary of State to “show more clearly how targets are being defined, measured and reported”.²⁰⁹

123. When we pursued the reasoning behind the 100,000 testing target with Mr Hancock in July, he agreed that the goal was a ‘personal initiative’ and explained it was informed by departmental projections:

The 100,000 target was chosen because that was close to our internal goal. Our internal projection for the end of April, when I set the 100,000 target at the start of April, was just over 100,000 tests a day.²¹⁰

Sir Chris Wormald, the Permanent Secretary at the Department of Health and Social Care, further commented that:

You should not read too much into what the scientists do and do not say about the target [...] Our consistent advice from science was that we needed to ramp up the testing fast, but the decision to go for 100,000, as the Secretary of State has described, was done on the basis of how fast we could do it, not that there was a scientifically derived right answer. [...] but I would not say there was any disagreement between our scientists and the more operational side. There was a clear need to ramp it up and setting a public target was a very good way of doing so.²¹¹

124. However, the Institute for Government (IfG), a think tank, suggested in a report, published in August, that the heavy public emphasis on the numerical target rather than a focus on an “analysis of the problem it was trying to solve and its policy goals, and then setting specific objectives to serve those goals” became a “distraction”.²¹² Further, the IfG report pointed out that while the Government reported that it had met its target—with 122,000 tests on 30 April—this included 27,000 testing kits sent by mail that day.²¹³ Data on the GOV.UK website subsequently confirmed that on 30 April, approximately 83,000 virus tests were carried out in laboratories, with a total available capacity of over 121,000 tests.²¹⁴ The lack of transparency in the reporting of testing data led Sir David Norgrove, Chair of the UK Statistics Authority, to write twice to the Secretary of State for Health and Social Care citing concerns over “limited detail” and that such data were “widely criticised and often mistrusted”.²¹⁵

125. In early September the Government announced a further goal to scale up testing capacity to “500,000 swab tests per day by the end of October”,²¹⁶ and the advice underlying this subsequent goal was also opaque. Speaking to us in September, Baroness Harding, head of NHS Test and Trace, explained that the organisation’s testing capacity plans were

208 Professor John Newton, Government advisor on increasing Covid-19 testing capacity ([Qq176–177](#))

209 UK Statistics Authority, ‘[Sir David Norgrove letter to Matt Hancock regarding covid-19 testing](#)’, 11 May 2020, accessed 22 August 2020

210 Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care ([Q1172](#))

211 Sir Chris Wormald, the Permanent Secretary at the Department of Health and Social Care ([Q1177](#))

212 Institute for Government, [Decision making in a crisis](#), August 2020

213 Institute for Government, [Decision making in a crisis](#), August 2020, p20

214 GOV.UK, [Coronavirus \(COVID-19\) in the UK](#), accessed 10 December 2020

215 (i) UK Statistics Authority, [Sir David Norgrove letter to Matt Hancock regarding COVID-19 testing](#), 11 May 2020; and (ii) UK Statistics Authority, [Sir David Norgrove response to Matt Hancock regarding the Government’s COVID-19 testing data](#), 2 June 2020

216 UK Government, [New Lighthouse Lab to boost NHS Test and Trace capacity](#), 3 September 2020

“based on SAGE modelling”.²¹⁷ However, Baroness Harding later wrote to us to clarify that “SAGE has not provided modelling of testing capacity requirements specifically” but that SAGE analysis factored into capacity modelling:

In order to model and forecast potential demand for testing and therefore what testing capacity will be required, NHS Test and Trace and the Department of Health and Social Care (DHSC) analysts draw on a range of sources including outputs from SPI-M modelling of the epidemic and modelling of the [Reasonable Worst Case Scenario] RWCS. Other sources include inpatient testing, screening for screening for elective/non elective admissions to hospital and NHS staff using information and forecasts from NHS England.²¹⁸

Testing capacity growth

126. As described to us by Sir Patrick Vallance in March, testing for the novel coronavirus in the early stages of the pandemic was “largely able to be done through Public Health England”.²¹⁹ Covid-19 testing was initially carried out solely within PHE’s London laboratories, before being expanded on 7 February to a further eleven PHE and NHS laboratories throughout the UK, which was described as the “fastest deployment of a novel test” in recent history.²²⁰

127. The UK’s initial centralised approach to testing differed from strategies employed in other countries, most notably the Republic of Korea. Speaking to us in early April, Dr Seon Kui Erica Lee, Director of Risk Assessment and International Cooperation at the Korea Centers for Disease Control and Prevention, explained that the country had “learned a lot of lessons from the [Middle East respiratory syndrome] MERS outbreak in 2015” and expanded testing capacity “in a very short period of time”:

Currently, there are a total of 118 institutions available for diagnostic tests: the Korea Centers for Disease Control and Prevention, the national quarantine stations, and the Institute of Health and Environment, which are affiliated with local government. Private clients, clinical laboratories and hospitals are all included in the national laboratory network. [...] The expansion of the testing capacity was made possible thanks to the active collaborative efforts between Government, academia and the private sector.²²¹

128. The focus on decentralised testing strategies was also reflected by World Health Organisation guidance published on 21 March:

If testing is available at the national level, plan for surge capacity by establishing decentralized testing capacity in sub-national laboratories under the supervision of the covid-19 national reference laboratory. Options to engage private laboratory services or the academic sector should be considered.²²²

217 Baroness Dido Harding, Head of NHS Test and Trace ([Qq1318–1320](#))

218 [Correspondence from Baroness Dido Harding regarding follow up evidence](#)

219 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q83](#))

220 UK Government, [PHE novel coronavirus diagnostic test rolled out across UK](#), 7 February 2020

221 Dr Seon Kui Erica Lee, Director of Risk Assessment and International Cooperation, Korea Centers for Disease Control and Prevention ([Q145](#))

222 World Health Organisation, [Laboratory testing strategy recommendations for covid-19: interim guidance](#), 21 March 2020

129. However, Professor Sharon Peacock, Director of the National Infection Service at PHE, explained that the UK had adopted a different model, comprising a “centralised, high-throughput” capability alongside a “distributed network of tests in the NHS”.²²³ While Professor Peacock acknowledged the possibility of such capacity being “exhausted”, requiring further expansion, she advocated a centralised approach:

First, we can open up new specific laboratories in universities or other hospital settings. Laboratories in this country have largely been merged, so we have a smaller number of larger laboratories. The alternative is to have a single large testing site. From my perspective, it is more efficient to have a bigger testing site than dissipating our efforts into a lot of laboratories around the country.²²⁴

130. When we questioned whether there had been an analysis underlying the decision to take a different course of action to the approach taken in the Republic of Korea, Public Health England undertook to share such information “in the next few days”.²²⁵ However, despite a series of exchanges with Public Health England—²²⁶and an apology from the then Chief Executive of PHE—no specific analysis for the decision has been forthcoming.²²⁷

131. Sir Paul Nurse, Director of the Francis Crick Institute, questioned the sole focus on a “mega-lab approach”, explaining that logistical issues would need to be “solved on a national scale” requiring time and effort. Speaking to us in April, he suggested that at the time it was “a bit late” to adopt this approach, and that a combination of both large national laboratories and smaller, localised collaborations were needed.²²⁸ This collaborative approach was reflected in an April press release, where Sir Paul commented publicly that “Institutes like [the Francis Crick] are coming together with a Dunkirk spirit – small boats that collectively can have a huge impact on the national endeavour.”²²⁹

132. Discussing the issues with testing capacity in May, Professor Yvonne Doyle, Director for Health Protection at Public Health England, explained that PHE did “not have capacity to do mass testing” and that in contrast with Germany, which had “many hundreds” of labs, the UK had a “different laboratory strategy, with mass laboratory testing and mass throughput through the NHS”.²³⁰ The Secretary of State for Health and Social Care echoed this to us in July, stating that PHE was “never set up to be a scale organisation”, but conceded that he did not know this in advance of the encountered issues. He also indicated that the policy for covid-19 testing “shifted over” to DHSC on 17 March, after which time it was “expanded”.²³¹ Mr Hancock also suggested that one lesson learnt was the need for a “standing capability” for mass testing.²³²

223 Professor Sharon Peacock, Director of the National Infection Service, Public Health England ([Q121](#))

224 Professor Sharon Peacock, Director of the National Infection Service, Public Health England ([Q122](#))

225 Professor Sharon Peacock, Director of the National Infection Service, Public Health England ([Qq121–124](#))

226 (i) [Correspondence from Chair to Professor Sharon Peacock](#), 30 March 2020; (ii) [Correspondence from Professor Sharon Peacock to Chair](#), 1 May 2020; and (iii) [Correspondence from Chair to Professor Sharon Peacock](#), 1 May 2020.

227 [Correspondence from Duncan Selbie to Chair](#), 7 May 2020

228 Sir Paul Nurse, Director, Francis Crick Institute ([Qq157–159](#))

229 Francis Crick Institute, [Francis Crick Institute and UCLH develop COVID-19 testing service for patients and NHS staff](#), 2 April 2020

230 Professor Yvonne Doyle, Director for Health Protection, Public Health England ([Q654](#))

231 Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care ([Qq1178–1179](#))

232 Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care ([Q1181](#))

133. This change of course was made clear to us by Professor John Newton, the then UK National Testing Strategy Coordinator, who wrote to us in June to outline that an “online portal”—launched on 8 April²³³—was created to accept offers of external support and that outreach activities had been undertaken:

To consolidate work with industry and other partners on increasing laboratory capacity, Government held two roundtables in March first with Universities UK, the Association of the British Pharmaceutical Industry, and DEFRA institutions, and then with a wider group of representatives from major research institutes, universities and government departments.²³⁴

134. However, several written evidence submissions provided to us from learned societies and research institutes pointed out that—early in the pandemic—there were difficulties in engaging with the Government to offer testing capacity and support such as scientists, equipment and consumables (e.g. swabs and chemicals).²³⁵ Further, it appeared there was a lack of clarity in what communication channels were available, with written submissions detailing failed attempts to contact PHE, DHSC, the Cabinet Office, NHS England and local NHS trusts. For example, the Royal Society of Chemistry highlighted this confusion:

a number of people that we spoke with in our community had worked to offer their capacity before [guidance was published by Government]. Many researchers were contacting multiple agencies, NHS trusts and government departments in parallel to offer support with no clear sense as to whether a national or local coordination effort was in place.²³⁶

The Society pointed to a “sense among researchers” that national structures and guidance arrived “too late” and that even when a centralised call to action was in place, many researchers “did not hear back for a long time” but that “at the same time, some were being contacted directly by local NHS trusts and hospitals asking for specific capabilities, suggesting that the centralised system was not delivering quickly enough”.

135. Evidence provided by Steve Bates, CEO of the Bioindustry Association, in early April also suggested that there was a lag in coordinating wider industry involvement in boosting testing capacity. Mr Bates explained to us that while Government collaborations with Thermo Fisher and Randox were “commissioned relatively recently”, specific details and plans for testing capacity requirements were only made clear a few days before our evidence session.²³⁷

136. Professor Doyle explained to us in May that one cause of the delay in coordinating external capacity was the initial categorisation²³⁸ of the novel coronavirus as a hazard group three pathogen:

The reason why every laboratory was not able to engage in this immediately [...] was that this was a novel virus. It was treated as a dangerous pathogen and was, therefore, categorised as level 3. That meant very few laboratories

233 GOV.UK, [Help the government increase coronavirus \(COVID-19\) testing capacity](#), published 8 April 2020

234 Written evidence submitted by Professor John Newton (C190034)

235 Written evidence submitted by the Earlham Institute (C190024), Royal Society of Chemistry (C190064), The Francis Crick Institute (C190072), Biochemical Society (C190088) and British Society for Immunology (C190093).

236 Written evidence submitted by the Royal Society of Chemistry (C190064)

237 Steve Bates, Chief Executive Officer, Bioindustry Association (Q161)

238 Health and Safety Executive, [Approved list of biological agents](#), p.7, July 2013

initially could [carry out testing]. We spotted that and made an application to the Committee on Dangerous Pathogens to reduce the level so that more laboratories could come on stream, because we knew there was going to be a capacity problem. On 1 March, the Health and Safety Executive granted that permission, and that then allowed many more laboratories to engage.²³⁹

137. The Government was too slow to increase testing capacity to the levels required to help contain the spread of the coronavirus. We have previously suggested that strategy was driven by the capacity available, rather than strategy driving the necessary increase in capacity. It was clear early in the year that Public Health England was not set up for the mass scale necessary for coronavirus testing. This lesson had previously been learned by countries who dealt with the MERS outbreak of 2015, and it is regrettable that it is a lesson that the UK did not heed in advance of the pandemic.

138. The Government was slow to move once it realised that coronavirus testing required a rapid expansion and did not engage sufficiently with the wide array of scientific expertise available within the UK—particularly within our universities and research institutes. While we appreciate the complexities of such a feat, including the need to ensure health and safety guidelines are adhered to, it does not justify that many researchers who were willing and able to contribute went unheard. An overt initial focus on boosting capacity within established structures—namely PHE and NHS laboratories—clouded the exploration of a more decentralised avenue, such as that clearly employed by the Republic of Korea. As such, a significant and foreseeable opportunity was missed to prepare the UK for a potential pandemic situation.

139. The Committee will report separately and more fully on the test, trace and isolate system and the mass testing programme in due course. But in considering the role of science advice, and its influence on Government decisions, we are concerned by the continued lack of justification provided to the Committee by Public Health England for taking an initial centralised approach, and why a more decentralised approach—drawing, for example, on the experience of the Republic of Korea—has not been followed.

140. The creation of NHS Test and Trace involves a budget of £22 billion for financial year 2020–21 and the justification for most of its spending being on the central part of the system, rather than through local public health teams, has not been clearly made. Concerns have also been raised about the inability of local public health teams to access timely information. This is particularly concerning given SAGE’s conclusion in September that the system, at that time, was “having a marginal impact on transmission”.

141. *The Government should: explain clearly the justification for taking a relatively centralised approach to test, trace and isolate; set out its assessment of the impact of the system on the spread of the virus since the outset, including on health outcomes; and review the balance between the local and national components of the system, including its value for money and effectiveness. The Government should set out the rationale and justification for, as the National Audit Office put it, the “unusual organisational relationship” that NHS Test and Trace has with the Department of Health and Social Care.*

239 Professor Yvonne Doyle, Director for Health Protection, Public Health England ([Q654](#))

Social distancing and face coverings

142. Throughout our inquiry we have taken evidence on the impact and justification for a wide range of non-pharmaceutical interventions, such as school closures and wider lockdown measures. While our enquiries have continued beyond the material covered in this Report, most notably as part of our joint inquiry with the Health and Social Care Committee into *coronavirus: lessons learnt*,²⁴⁰ we discuss two specific measures in this section: face coverings and the two-metre rule.

The two-metre rule

143. Social distancing guidance published by the Government on 23 March recommended that individuals keep a two-metre distance from anyone outside of their household, to reduce risk of transmission of the novel coronavirus.²⁴¹ One SAGE paper considered on 12 March analysed the evidence available at the time and concluded that “1 metre is a minimum, 2 metres is precautionary”, further stating that a contact duration of over 15 minutes was “pragmatic and possibly conservative”.²⁴² Nevertheless, many different countries adopted differing recommendations on social distancing, with the World Health Organisation recommending a distance of “at least 1 meter” from those with symptoms as early as January.²⁴³

144. Speaking to us in May, Professor Yvonne Doyle indicated that the UK had looked at “a range of international evidence” and taken a “precautionary approach and said 2 metres, full stop”, although she acknowledged that there was a “balance”: “On one side, we are aware of the requirements of the economy and business; on the other side, we are aware of the concerns and anxieties of the population”.²⁴⁴ In the same evidence session, Professor Catherine Noakes, Professor of Environmental Engineering for Buildings at University of Leeds and a SAGE participant, pointed out that the science underlying the 2-metre rule was “very complex” and could be adjusted, but concluded that the recommendation was based on “where the evidence is sitting at the moment”.²⁴⁵ Nevertheless, she also highlighted that in countries such as Singapore and Hong Kong, where social distancing of 1 metre was recommended, mask wearing was mandatory which “probably reduces the distance that [droplets] can be projected”, although she suggested this was a “policy decision”.²⁴⁶

145. We subsequently wrote to the Prime Minister on 29 May requesting a review of the two-metre rule, following guidance considered by SAGE from 28 April that acknowledged that it was “possible to put control measures in place to enable distancing at less than 2m”.²⁴⁷ A review was subsequently carried out and published in late June, concluding that

240 More information on Science and Technology Committee and Health and Social Care Committee joint inquiry into *Coronavirus: lessons learnt* may be found at: <https://committees.parliament.uk/work/657/coronavirus-lessons-learnt/>

241 UK Government, [Staying at home and away from others \(social distancing\)](#), 23 March 2020, accessed 27 November 2020

242 NERVTAG, [Paper for SAGE—distance, time, handshakes](#), 12 March 2020

243 World Health Organisation, [Advice on the use of masks in the community, during home care and in health care settings in the context of the novel coronavirus \(2019-nCoV\) outbreak](#), 29 January 2020

244 Professor Yvonne Doyle, Director for Health Protection, Public Health England ([Q695–698](#))

245 Professor Catherine Noakes, Professor of Environmental Engineering for Buildings, University of Leeds ([Q711](#))

246 Professor Catherine Noakes, Professor of Environmental Engineering for Buildings, University of Leeds ([Q754](#))

247 (i) [Correspondence from Chair to the Prime Minister regarding lessons learned so far from the covid-19 pandemic](#); and (ii) SAGE Environmental and Modelling Group, [Environmental Influence on Transmission](#), 28 April 2020

“guidance should change to state that 2m or 1m with risk mitigation (where 2m is not viable) are acceptable”.²⁴⁸ This proved essential for hospitality venues being able to open up, as reflected by comments by Dame Carolyn Fairbairn, CBI Director-General, on 23 June that “easing social distancing rules will make a material difference to the viability of thousands of firms.”²⁴⁹

Face coverings

146. Although World Health Organisation guidance from January concluded that “no evidence is available on [masks’] usefulness to protect non-sick persons”—a message which was reinforced in April—later guidance issued in June changed and recommended that “governments should encourage the general public to wear masks in specific situations”.²⁵⁰ UK Government guidance in England on the use of face coverings began with masks becoming mandatory on public transport from 15 June; in shops and supermarkets from 24 July; and in further indoor settings from 8 August.²⁵¹

147. When we asked Sir Patrick Vallance in July on whether the UK had deviated from WHO guidance on social distancing rules and the use of face coverings, he suggested that was not the case:

If you go back, our advice on face masks was in April. We said that face masks are of marginal positive value when used in enclosed spaces where crowding may occur and you cannot keep 2 metres’ distance. That is, essentially, the advice that WHO have come out with and is, essentially, the advice that now forms the basis of policy [...] We were rather ahead of [WHO] in terms of that particular piece of advice.²⁵²

Sir Patrick cautioned that there was a “danger of confusing operational accountability with scientific advice”, but pointed out that SAGE was not the only source of science advice and that there was “a whole system of public health and other things that make decisions based on science”. Providing an example of further considerations, he suggested there was a “real concern” that the supply of medical-grade masks would be affected if face coverings were made mandatory in April.²⁵³

148. The Secretary of State for Health and Social Care outlined his view to us in July that the change of policy on face coverings was a “classic example” of responding to a change in scientific evidence, for which he made “no apologies”.²⁵⁴ However, written evidence from the Royal Society suggested that a precautionary approach was not immediately applied to the use of face coverings in the UK:

248 UK Government, [Review of two metre social distancing guidance](#), 26 June 2020, accessed 27 November 2020

249 Confederation of British Industry, [CBI responds to the Prime Minister’s statement on social distancing rules](#), 23 June 2020

250 (i) World Health Organisation, [Advice on the use of masks in the community, during home care and in health care settings in the context of the novel coronavirus \(2019-nCoV\) outbreak](#), 29 January 2020; (ii) World Health Organisation, [Advice on the use of masks in the context of covid-19](#), 6 April 2020; and (iii) World Health Organisation, [Advice on the use of masks in the context of covid-19](#), 5 June 2020

251 (i) UK Government, [New rules on face coverings coming in on Monday will help keep passengers safe](#), 12 June 2020; (ii) UK Government, [Face coverings to be mandatory in shops and supermarkets from 24 July](#), 14 July 2020; and (iii) UK Government, [Prime Minister’s statement on coronavirus \(COVID-19\): 31 July 2020](#); 31 July 2020

252 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1055](#))

253 Sir Patrick Vallance, UK Government Chief Scientific Adviser ([Q1058](#))

254 Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care ([Q1230](#))

even in the absence of [randomised controlled trial] RCT evidence, it was [the] understanding of modes of transmission and the need for precautionary common sense that convinced over 50 governments, including the UK, to make the use of face masks mandatory in situations where physical distancing is not possible or predictable such as busy public transport, shopping and other potentially crowded public or workspaces.²⁵⁵

149. Throughout the pandemic, the UK has relied on its own bespoke system of science advice and guidance on non-pharmaceutical interventions, while at the same time global-level guidance has been issued regularly by the World Health Organisation (WHO). There have also been numerous opportunities to learn from the approaches undertaken by nations around the world. The UK's policies on areas such as testing and tracing, the two-metre rule and the use of face coverings suggest that the Government's approach has been to carve its own path between SAGE and WHO advice. We have heard that a "precautionary" approach was taken to social distancing in the UK—based on SAGE guidance—above the World Health Organisation's recommendation of "at least 1 metre". However, on face coverings a precautionary approach was not employed, and SAGE's recommendations were not taken up until two months after they were made. In general, more lessons could have been applied from the experiences of other countries, particularly those which have dealt with previous coronavirus outbreaks (e.g. SARS and MERS). *The Government should commit to review—before the end of 2021—the relationship between SAGE and expert advisory structures in other countries and the World Health Organisation, to understand where knowledge sharing may be improved during future emergencies.*

150. Given the importance of refining interventions to mitigate both impacts on public health and economic recovery, a review of social distancing measures came quite late. While the scientific approach quite rightly waits for the evidence before making a definitive recommendation, this often necessitates delay and may not produce conclusive results. The pandemic has demanded that policy be made and adapted on a faster timescale and in this instance the Government was too slow to respond. *The Government should employ a more adaptive approach to non-pharmaceutical interventions such as social distancing rules and commit to a review of the approach employed in the UK as compared with countries that dealt with the SARS and MERS outbreaks (such as the Republic of Korea), setting out the reasoning for differences in policy decisions. The outcome of this review should be published by the end of 2021.*

Vaccine and therapeutic development

151. The May covid-19 recovery strategy reflected the UK Government's emphasis on a research-led exit from the pandemic, stating that it was "clear that the only feasible long-term solution lies with a vaccine or drug-based treatment".²⁵⁶ While research and development efforts into vaccines and treatments for covid-19 have much yet to discover, significant progress has been made.²⁵⁷ This section will briefly explore the initial science advice around Government support for research efforts into vaccines and therapeutics.

255 Written evidence submitted by the Royal Society (C190110)

256 UK Government, [Our Plan to Rebuild: covid-19 recovery strategy](#), May 2020

257 BBC News, [Covid vaccines: Who decides if they are safe?](#), accessed 26 November 2020

152. As early as 18 February, SAGE discussed that it was “essential that the UK plans for how it will handle clinical trials and treatment should there be an outbreak of covid-19 in the UK”.²⁵⁸ Subsequently on 16 March, DHSC mandated that the National Institute for Health Research (NIHR) “prioritise nationally-sponsored covid-19 research activity”, including the temporary pausing of non-covid-19 clinical research, unless doing so would “have significant detrimental effects on the ongoing care of individual participants”.²⁵⁹ This suspension continued until 21 May when the NIHR released a ‘Framework for restart’ of research not relating to covid-19.²⁶⁰ Other measures were announced in March by the Health Research Authority and the Medicines and Healthcare products Regulatory Agency—the UK’s regulators of clinical research—to “fast track” ethical reviews and provide “rapid scientific advice, reviews and approvals” in a similar fashion to during the 2014 Ebola epidemic when clinical trials were authorised “within a week”.²⁶¹ Nevertheless, Professor Andrew Pollard, Professor of Paediatric Infection and Immunity at the University of Oxford, explained to us in March that while “regulatory reviews that may take months are being done in days”, it was not due to “shortcuts” being used but rather that the regulatory bodies were “putting more people on it”.²⁶²

153. Speaking to us in July, Deputy Chief Medical Officer Professor Jonathan Van-Tam suggested that the rapid pace of research developments was in part due to lessons learned from a “reflection exercise” following the 2009 swine flu pandemic:

we had to get an awful lot of research going very fast, from a blank sheet of paper. After that [exercise], the mentality changed. There is a long list of studies on pandemic influenza that were prepared, rehearsed, funded and then mothballed, ready for an influenza pandemic. [...] First of all, it was getting research moving much, much faster, and indeed repurposing some of the studies that had been prepared for pandemic flu to mobilise them for a new purpose to the coronavirus pandemic.²⁶³

Giving an example of the speed of establishing research in the UK, Professor Van-Tam pointed out that the set-up of the large-scale RECOVERY trial took place over a “matter of a couple of weeks from concept through to the first patient being recruited”.²⁶⁴

154. Reflecting the drive towards recruitment to covid-19 clinical trials, SAGE guidance from 26 March cautioned that it was “vital not to make hasty decisions regarding treatments based on poor data. All cases should be used in some form of clinical trial”.²⁶⁵ In April, the four Chief Medical Officers (CMOs) of the UK and the National Medical Director for NHS England wrote to all NHS trusts to ask that “every effort is made” to enrol patients in three nationwide phase III clinical trials: PRINCIPLE; RECOVERY; and REMAP-CAP.²⁶⁶ Further, the letter cautioned against the use of off-licence medicines outside of clinical trials settings:

258 GOV.UK, [Eighth SAGE meeting](#), 18 February 2020

259 National Institute for Health Research, [DHSC issues guidance on the impact of COVID-19 on research funded or supported by NIHR](#), 16 March 2020

260 National Institute for Health Research, [Supporting the restart of paused NIHR research activities](#), 21 May 2020

261 (i) Health Research Authority, [Research in a public health emergency](#), accessed 10 December 2020; and (ii) UK Government, [Clinical trials applications for Coronavirus \(COVID-19\)](#), dated 23 March 2020

262 Professor Andrew Pollard, Professor of Paediatric Infection and Immunity, University of Oxford ([Q49](#))

263 Professor Jonathan Van-Tam, Deputy Chief Medical Officer ([Q997](#))

264 Professor Jonathan Van-Tam, Deputy Chief Medical Officer ([Q998](#))

265 GOV.UK, [Nineteenth SAGE meeting](#), 26 March 2020

266 NIHR, [UK’s top doctors urge recruitment of covid-19 patients for vital scientific research](#), 3 April 2020

we strongly discourage the use of off-licence treatments outside of a trial, where participation in a trial is possible. Use of treatments outside of a trial, where participation was possible, is a wasted opportunity to create information that will benefit others.

A subsequent letter was issued on 6 May, emphasising that as covid-19 hospital admissions decreased it would “become even more important that a high proportion of patients with covid-19 are enrolled onto trials”.²⁶⁷ Associate Professor Ed Juszczak, Director of the National Perinatal Epidemiology Unit Clinical Trials Unit at the University of Oxford has suggested that the encouragement of the CMOs had been “fundamental” to the success of the RECOVERY trial and the speed of its growth.²⁶⁸

155. Efforts were also made to coordinate research and development (R&D) efforts around vaccines and treatments within the heart of the Government. On 17 April, the Government announced the launch of a Vaccine Taskforce to “drive forward, expedite and co-ordinate efforts to research and then produce a coronavirus vaccine.”²⁶⁹ Similarly, a Therapeutics Taskforce was established in early April “to ensure that promising therapies are tested as fast as possible and that patients in the UK get access to effective medicines as soon as possible.”²⁷⁰ A SAGE report from 6 April (published 19 June) suggested that before the Vaccine Taskforce was set up, work across Government was “not sufficiently coordinated”.²⁷¹ Kate Bingham, the then Chair of the Vaccine Taskforce, explained to us in July how the group linked together vaccine expertise from across the public and private sectors:

We have worked quite quickly. [...] We have assembled a private sector expert team that we have embedded within Government. In addition, we have seconded people from NIHR, which is the national institute in the UK that runs clinical studies, and MHRA, which is the regulator that decides whether or not vaccines and drugs are safe and effective. That means we are getting realtime top advice.²⁷²

156. Beyond research efforts, it was also clear from the outset that significant expense would be required at risk of failure. Professor Andrew Pollard, of the University of Oxford, explained to us in our first evidence session in March that this was “one of the real challenges that makes this very different from normal vaccine development”:

you would not normally invest at risk in upscaling manufacturing at this very early stage, before we even have any data in humans. If you wait for all the trials to complete before you do that, we are years and years away.²⁷³

Professor Pollard further suggested that while manufacturing processes were “fairly standard”, the challenge was to free up “more capacity to get there quicker, rather than cutting corners.”²⁷⁴

267 NIHR, [UK's Chief Medical Officers urge recruitment of more covid-19 patients for vital scientific research](#), 6 May 2020

268 RECOVERY trial, [RECOVERY team reflect on International Clinical Trials Day 2020](#), 20 May 2020

269 UK Government, [Government launches Vaccine Taskforce to combat coronavirus](#), 17 April 2020

270 (i) UK Government, [Health and Social Care Secretary's statement on coronavirus \(COVID-19\): 3 April 2020](#), 30 April 2020; and (ii) GOV.UK, [UK Therapeutics Taskforce Specification](#), 16 April 2020

271 GOV.UK, [Vaccine Taskforce Aims](#), 6 April 2020

272 Kate Bingham, Chair, Vaccine Taskforce ([Q944](#))

273 Professor Andrew Pollard, Professor of Paediatric Infection and Immunity, University of Oxford ([Q53](#))

274 Professor Andrew Pollard, Professor of Paediatric Infection and Immunity, University of Oxford ([Q49](#))

157. When we subsequently wrote to the Secretary of State for Health and Social Care to raise these points,²⁷⁵ we heard that the development and distribution of a covid-19 vaccine was a “top priority” for the Government and that the purpose of the Vaccine Taskforce was to “make sure all parts of the pursuit for a vaccine are as efficient as possible”.²⁷⁶ We also received later updates from the Secretary of State for Business, Energy and Industrial Strategy on further Government investment into vaccine manufacturing and supply.²⁷⁷ The effort within the UK towards the development of vaccines, and securing of their supply, has resulted in the UK having access to one of the highest potential number of doses per head—including the vaccine candidate developed by the University of Oxford—²⁷⁸ and being the first country to approve the use of a leading vaccine.²⁷⁹

158. The development of vaccines and therapeutics is a policy area in which it is right that science must lead the way, so that there may be a high level of confidence that a rigorous approach has been taken towards safety and efficacy. From the beginning of the pandemic, the clear advice from experts was that significant investment and resource, at risk of failure, was required on many fronts to maximise the potential for success. The Government listened to this advice and we applaud the speed at which the Government implemented support for research and clinical trials, and took steps to secure the manufacture and procurement of potential vaccines.

159. We acknowledge that a large part of the success to date into the development of covid-19 vaccines and therapeutics can be credited to lessons learned from previous outbreaks and efforts made to prepare for future crises. As further promising vaccine candidates and treatments come to light, other aspects of the Government’s pandemic preparedness, such as the logistics of a mass vaccination campaign, will be tested.

275 [Correspondence from Chair to the Secretary of State for Health and Social Care regarding covid-19 vaccines](#), 30 March 2020

276 [Correspondence from the Secretary of State for Health and Social Care to the Chair](#), 9 April 2020

277 (i) [Correspondence from the Secretary of State for Business, Energy and Industrial Strategy to the Chair](#), 18 May 2020; (ii) [Correspondence from the Secretary of State for Business, Energy and Industrial Strategy to the Chair](#), 23 July 2020

278 Deutsche Bank, [Climbing out of Covid: Nearly there?](#), accessed 2 December 2020

279 GOV.UK, [UK medicines regulator gives approval for first UK covid-19 vaccine](#), 2 December 2020

Annex One: Letter from the Chair of the Committee to the Prime Minister, dated 18 May 2020

Dear Prime Minister,

COVID-19 pandemic: some lessons learned so far

I am writing to you on behalf of the House of Commons Science and Technology Committee. We are delighted to see you back after your recovery from Coronavirus and send our warm congratulations to you and Carrie on the birth of your son.

My Committee has been taking evidence relating to the COVID-19 pandemic as part of our inquiry, UK Science, Research and Technology Capability and Influence in Global Disease Outbreaks.²⁸⁰ It is important for us to ask questions during the pandemic both:

- i) to ensure that contemporary evidence is captured on decisions and assessments so that not all evidence relies on recollections and hindsight; and
- ii) so that any lessons learned which are relevant to the ongoing management of the pandemic can be uncovered and applied.

With the second purpose in mind, we wanted to share with you, your Ministers and advisers some findings that we have identified through our first six public evidence sessions that have implications for the ongoing response to the pandemic.

It is important to say from the outset that any live response to this new and deadly virus—which was unknown to most of the world at the beginning of this year, and which has spread explosively to almost every country on Earth, and whose medical and scientific characteristics are being revealed and analysed day-by-day—to entail decisions, made in good faith and with the best information then available—which turn out to be wrong as well as right. Judgements, necessarily made within a fog of uncertainty, will be revealed by subsequent experience some to have been correct, and some incorrect. Scientific hypotheses that were advanced on good grounds when tested by the emerging evidence will be found in some cases to gain in force, and in others to need to be revised or retired.

We seek to be purposeful: in the true spirit of science to confront theory and early practice with the evidence that experience makes available, and so to be able to learn and apply the lessons at the earliest possible opportunity.

A policy and practice that is open to learning from experience and making necessary adjustments is more deserving of public confidence than one which is impervious to criticism or resistant to alteration.

On this basis, we offer ten findings and recommendations so far.

280 <https://committees.parliament.uk/work/91/uk-science-research-and-technology-capability-and-influence-in-global-disease-outbreaks/>

SCIENTIFIC ADVICE TO GOVERNMENT

Finding 1: The Government has sought to obtain and act on good scientific advice

The United Kingdom benefits from one of the strongest bases of scientific expertise in the world—in terms of both individuals and institutions.

The conception and structure of the Scientific Advisory Group for Emergencies (SAGE) and its sub-groups is designed to capitalise on this strength—drawing on a range of specialists whose expertise is most relevant to the nature of the emergency in question.

It is clear from all of our evidence sessions that SAGE and its subsidiary groups have been extensively consulted and highly influential in Government decisions throughout the pandemic.

The leading scientists in SAGE, the Government Chief Scientific Adviser (GCSA), Sir Patrick Vallance, and the Chief Medical Officer for England (CMO), Professor Chris Whitty, are substantial figures with independent reputations. SAGE has met frequently throughout the crisis and, according to its website, 26 times from late January to mid-April.²⁸¹

Several witnesses who have participated in SAGE meetings described how the Group has made a serious attempt to distil the range of scientific views into advice to Government.

Professor Neil Ferguson, for example, told us:

The Government have, I believe, been informed by the scientific evidence and have balanced that against other considerations—economic, health and all the things one might expect them to do.²⁸²

Professor Chris Whitty explained the different groups feeding into SAGE:

You have to remember that underneath the SAGE structure sit multiple other professional scientific advisory groups, and underneath that is a whole body of fantastic academic work.²⁸³

Witnesses told the Committee that the distinction between distilling up-to-date scientific knowledge—including areas of differing opinion—relevant to policy decisions and directing those decisions was well understood by those who have participated in SAGE meetings.

Sir Patrick Vallance, for example, told us that he thought:

the Government have listened to the advice of SAGE very carefully and followed it. Clearly, there are decisions that need to be made by politicians on how they want to implement that advice, and those areas are, rightly, political decisions and not scientific ones.²⁸⁴

281 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/883086/sage-meeting-papers.csv

282 Q9 (all question numbers in footnotes refer to oral evidence taken before the Committee—transcripts are published on the Committee website: <https://committees.parliament.uk/committee/135/science-and-technology-committee-commons/publications/oral-evidence>)

283 Q247

284 Q80

Further when we asked Sir Patrick in March if there had been any “significant disagreement between the Government and their scientific advisers on anything material”, he was unambiguous in his response, simply replying “no”.²⁸⁵

Professor Chris Whitty told us how SAGE sought to distil the scientific evidence and its associated uncertainties—which may lead to a difference of opinion among those who have participated in SAGE meetings—in a helpful way for the Government to aid decision making:

It is not very useful to Ministers or other decision makers to say, “There are 16 opinions. Here are all 16. Make up your mind.” Part of the process is to say in a unified way, “Here is the central view”, and then, if there are either dissenting views or a range of uncertainty quantitatively around that, to convey it in a way that is comprehensible to the people who are listening so that they understand the certainty with which the advice is being proffered. If they do not, it is clearly going to lead to bad decision making.²⁸⁶

The Government Chief Scientific Adviser (GCSA) similarly explained:

I think what SAGE has to do is to try to take complex science and bring it to a position where we say, “This is the consensus view of where we are now, but we are clear about the function and purposes of argument.” What I think is not helpful is to say, “Here are several different views,” and ask somebody who is less knowledgeable to bring these together and come to a single view. In SAGE, we try to come up with a consensus view, but we are always clear and open about how we arrive at that.²⁸⁷

While there is, and must continue to be, a clear distinction between the role of scientists as advisers, and Ministers as decision-takers, it is clear that the Government has been serious in taking scientific advice, and that British scientists on SAGE have sought to give that advice in a way designed to help decision making.

Recommendation 1: The Government should continue to draw on extensive scientific advice through the further stages of the pandemic.

Finding 2: The transparency around scientific advice has not always been as clear as it should have been.

The strength of British science and the prominent role that scientific advice has played during the pandemic can be an important source of public confidence. The regular appearances of the GCSA and CMO at Downing Street press conferences have been a public demonstration that scientific advice has been influential in Government decisions.

Yet there have been a number of concerns over the transparency of the scientific advice given and its relationship to Government decisions.

First, transparency over the membership of SAGE and the groups feeding into it was not initially addressed.

285 Q841

286 Q249

287 Q78

There are a number of reasons why transparency over who attends SAGE is beneficial.

It is likely to be a source of strength to demonstrate the breadth and depth of scientific advice that is being drawn on by Ministers and officials; and it also allows scrutiny of whether SAGE contains the appropriate range of disciplines necessary to give rounded advice.

Following evidence sessions held by the Committee, Sir Patrick Vallance made a commitment to publish the membership of SAGE. The Committee is grateful for that response to its concerns and strongly welcomes the decision.

All but two of the names of people who have attended SAGE were published on 4 May. However, the published list conflates those who are part of a core membership that has guided policy throughout the pandemic while others—as Professor Sir David Spiegelhalter told us—had been present for a single meeting.

A second concern is over the timely publication of the scientific papers on which SAGE has drawn for its advice. A website was established within gov.uk (“Scientific advice supporting the government response to COVID-19”) containing relevant papers.²⁸⁸ A commitment was given to the Committee in a letter on 4 April from Sir Patrick Vallance “to regularly publish evidence documents and studies on gov.uk which have formed the basis of SAGE’s discussions and advice”.²⁸⁹

However, after March no further papers were uploaded to the website until—after the Committee raised the matter with the CMO at our hearing on 24 April—a further set of papers were published on 5 May.

While it is welcome that some papers used to inform SAGE meetings have been published on this website, to date the majority of papers (92 out of 120) have not been published according to the full list of meeting papers published on gov.uk, meaning much of the evidence informing SAGE is still not in the public domain.²⁹⁰

The CMO explained in evidence on 24 April that in certain emergencies, questions of protecting intelligence and national security arise:

The last time there was a SAGE thing was the Novichok poisonings in Salisbury; at that point I was interim chief Government scientific adviser and I chaired it. There was absolutely no way we were going to put those documents into the public domain, nor will we. I have also been involved previously in SAGE meetings where some of the information was at a classified level and some was not. There will be a mixture.²⁹¹

That is completely understood and accepted by the Committee. However the CMO acknowledged that the current circumstances are different:

288 <https://www.gov.uk/government/groups/scientific-advisory-group-for-emergencies-sage-coronavirus-covid-19-response#contents>

289 <https://publications.parliament.uk/pa/cm5801/cmselect/cmsctech/correspondence/Patrick-Vallance-to-Greg-Clark-re-SAGE-composition.pdf>

290 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/883086/sage-meeting-papers.csv

291 Q259

SAGE on this occasion is dealing with something that is a straight science-to-policy question [...] wherever possible, we absolutely should be putting out the data and trying to give the underlying workings.²⁹²

Our third observation concerns the transparency of SAGE's advice itself. The Government has drawn attention to basing its decisions on scientific advice, while accepting that policy decisions are made by Ministers rather than scientific advisers. Individuals who have participated in SAGE meetings during the current pandemic have confirmed that. For example, Professor Neil Ferguson said: "To be clear, SAGE does not recommend policy".²⁹³

It is clearly important that this distinction is respected. However, there is no transparency over what the advice of SAGE is—whether in the form of its actual advice to Ministers, minutes of its meetings, or even a summary, suitable for publication, of its advice.

Without visibility of the scientific advice it will be difficult to corroborate the Government's assertion that it always follows the scientific advice.

In particular, there will be a margin of ambiguity about what was the scientific advice and what was a matter of policy. To avoid the risk of elision between the scientific advice and policy decisions, it would be good practice to ensure these are always distinguishable.

Recommendation 2: To increase transparency in the provision of scientific advice the Government should:

- iii) **update regularly the now public list of members of SAGE and state how many meetings the named people attended;**
- iv) **disclose the disciplines of SAGE participants who are not publicly named;**
- v) **publish promptly the papers on which SAGE draws for its advice after each relevant meeting; and**
- vi) **publish now and regularly a summary of the scientific advice which has informed Government decisions.**

CO-ORDINATION IN SCIENTIFIC ADVICE BETWEEN THE UK NATIONS

Finding 3: The provision of scientific advice has been well co-ordinated between all four nations of the United Kingdom.

The Chief Medical Officers for the four nations of the United Kingdom all told us of the strong co-operation and regular liaison between the public health organisations of the UK.

Dr Gregor Smith, interim Chief Medical Officer for Scotland, for example, told us that there has "been regular discussions between the four UK CMOs", with them speaking to:

one another at a minimum three times a week, but we take various opportunities to ensure that we link with one another through senior clinician groups or through more ad hoc meetings because things have arisen that we need to speak about with more urgency.²⁹⁴

292 Q259

293 Q9

294 Q231

Further, Dr Smith explained the joint approach that the four nations had been taking: “In any of the discussions across the four nations between the CMOs, there has been a remarkable sense of agreement on the approaches we need to take from the scientific base”.²⁹⁵

The CMO for England made similar points to the Committee:

The interaction among the CMOs has been excellent throughout, and we often communicate several times a day if things are urgent. We also all interact with our own chief scientific advisers to Government. I operate incredibly closely with Sir Patrick Vallance and talk to him or communicate with him at least once a day, often more frequently, as things go along.²⁹⁶

Dr Smith told the Committee that although there could be circumstances in which the appropriate measures for managing COVID-19 could be different in some parts of the UK, there was value to consistent messaging for ensuring public understanding and compliance.²⁹⁷

Two potential future reasons for divergent measures advanced were that:

- vii) there could be in future different local stages of development in the epidemic; and
- viii) different operational capabilities of the NHS and public health authorities in different parts of the United Kingdom.²⁹⁸

Professor Whitty explained that the recent peak in infections was an “artificial” peak brought about through social distancing measures, and that because those measures were introduced across the UK at “almost exactly the same time” the peak was “occurring at broadly the same time around the country”. Consequently, Professor Whitty advised that “the argument for strong regional variation in what we do is not terribly convincing”.²⁹⁹ All four Chief Medical Officers of the UK indicated their support for this position.³⁰⁰

Recommendation 3: All four UK Chief Medical Officers should continue to work closely together on their responses to COVID-19.

TESTING, TRACING AND ISOLATION

Finding 4: Testing capacity has been inadequate for most of the pandemic so far. Capacity was not increased early enough or boldly enough. Capacity drove strategy, rather than strategy driving capacity.

One of the most significant problems of the handling of the pandemic to date in the United Kingdom has been the lack of capacity to test people to determine whether they have COVID-19. Very low numbers of people were being tested well into March, with the number of tests actually falling at a critical time to 1,215 on 10 March.³⁰¹

295 Q236

296 Q232

297 Q252

298 See for example Qq252–253.

299 Q280

300 Q281

301 As of 9am 11 March 2020, a total of 27,476 people had been tested, up from 26,261 (as of 9am on 10 March) See <https://twitter.com/DHSCgovuk/status/1237740175582801921> and <https://twitter.com/DHSCgovuk/status/1237382759812861952>

The Committee has found a consensus embracing a broad range of experts from within the UK and overseas—including among the Government’s scientific advisers—that testing capacity has been too low.

Sir Patrick Vallance told the Committee on 25 March that he wished the UK had “more tests available today”, and that “it would be great to have got ahead of this more than we have been able to”.³⁰²

Professor Chris Whitty stated on 24 April that SAGE had consistently said that “one of the things we need is a greater capacity to test [for COVID-19] across the whole of the UK”.³⁰³

As far back as February, the WHO-China Joint Report said that countries should “immediately expand surveillance to detect COVID-19 transmission chains by [...] adding testing for the COVID-19 virus to existing surveillance systems”.³⁰⁴

The Committee heard from witnesses from the Republic of Korea, Hong Kong and Germany who all emphasised the foundational nature of establishing mass testing capacity from an early stage.

It was therefore identifiable from the beginning of the pandemic that testing capacity would be crucial.

The evidence from Professor Sharon Peacock of Public Health England (PHE) to the Committee on 25 March was that PHE had chosen to follow a different approach to countries like the Republic of Korea which had engaged in mass testing from an early stage. Professor Peacock undertook to share “in the next few days” with the Committee the evidence and analysis on which the decision to reject the South Korean approach was taken.³⁰⁵

Despite several requests by letter, email and telephone since the 25 March, PHE has not produced to the Committee the basis for the pivotal decision to choose an initially centralised, smaller scale approach to testing over other leading international approaches.

In a letter of 1 May (for which the Chief Executive of PHE has subsequently apologised³⁰⁶) PHE sought to discharge their obligation to share the evidence on which their decision was based at the time by pointing to a completely different study only now being carried out by the Royal Society on how testing is carried out by other countries.³⁰⁷

The Committee, through the Chair, questioned the Secretary of State in the Chamber of the House of Commons on 26 February³⁰⁸ and 11 March³⁰⁹ on what steps were being taken to expand capacity, and in correspondence of 30 March and 14 April.³¹⁰ Answers reiterated that a gradually expanding, centralised approach was being taken, within PHE laboratories.

302 Q85

303 Q257

304 Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)

305 Qq121–124

306 Letter from PHE on 7 May

307 Letter from PHE on 1 May

308 <https://hansard.parliament.uk/Commons/2020-02-26/debates/B0FE8C31-77D5-40AA-97AFBBA8FB620A95/Coronavirus#contribution-20659EA2-7415-4DC9-BB45-3D59E18D1D01>

309 <https://hansard.parliament.uk/Commons/2020-03-11/debates/E9C77FF3-6EB8-4A29-8877-33359AB8C414/Coronavirus#contribution-964EA313-B93C-409E-9D6B-B15BB7223C9E>

310 Correspondence between Rt Hon Greg Clark to Professor Sharon Peacock, Kathy Hall and Professor John Newton

In evidence to the Committee, Sir Paul Nurse, Director of the Crick Institute, said that he had offered his laboratories and staff to the testing effort but he did “not think that [he] got a reply” until weeks later, once the Crick Institute had publicly announced its provision of testing for healthcare workers.³¹¹

The decision to pursue an approach of initially concentrating testing in a limited number of laboratories and to expand them gradually, rather than an approach of surging capacity through a large number of available public sector, research institute, university and private sector labs is one of the most consequential made during this crisis. From it followed the decision on 12 March to cease testing in the community and retreat to testing principally within hospitals.

Amongst other consequences, it meant that residents in care homes—even those displaying COVID-19 symptoms—and care home workers could not be tested at a time when the spread of the virus was at its most rampant.

The failure of PHE to publish the evidence on which its testing policy was based is unacceptable for a decision that may have had such significant consequences. The absence of disclosure may indicate that—notwithstanding the oral evidence given to the Committee—no rigorous assessment was in fact made by PHE of other countries’ approach to testing. That would be of profound concern since the necessity to consider the approaches taken by others with experience of pandemics is obvious.

It is vital that the formal assessment made at the time is published without further delay, or, if it does not exist, PHE is open about this and explains why.

Several witnesses who have participated in SAGE meetings told us that the capacity to test was an operational matter under the control of PHE, rather than one that they could determine. For example, Professor Neil Ferguson told us that testing had “always been discussed significantly” at SAGE, but that “the reason it was not included in initial modelling was about the projections by PHE of how quickly this country could ramp up testing capacity”.³¹²

On 2 April the Secretary of State for Health and Social Care, Matt Hancock MP, announced a target of 100,000 tests a day to be carried out by the end of that month. However, Professor Whitty made clear to the Committee that “SAGE did not give that specific target”.³¹³ Even public officials emphasised that the 100,000 target was the Secretary of State’s choice, with Professor John Newton explaining:

I think specifically, no, it is not a SAGE target; it is the Secretary of State’s target. I think he has taken advice from the programme and from colleagues [...] I am afraid you would have to ask the Secretary of State himself exactly where he got his advice from.³¹⁴

While there was some public debate at the time about whether the target was met by 30 April, it is clear that it drove a major expansion of testing to a level, in capacity at least, comparable with what Germany had enjoyed for several weeks.

311 Q119

312 Q20

313 Q257

314 Qq138–139

For such an important determinant of a wide range of policy responses, it is surprising that a target designed to galvanise a tenfold increase in testing capacity appears not to be on the advice of PHE, NHS England or SAGE but was more of a personal initiative by the Secretary of State. Had the public bodies responsible in this space themselves taken the initiative at the beginning of February, or even the beginning of March, rather than waiting until the Secretary of State imposed a target on 2 April, knowledge of the spread of the pandemic and decisions about the response to it may have made more options available to decision makers at earlier stages.

Recommendation 4: The Government should publish the assessment of other countries' testing models on which the decision to follow a centralised, sequential approach was based.

Finding 5: It is not clear that the lessons of the delays to testing have been learned.

Although multiple witnesses told the Committee that it would have been desirable had much greater testing capacity been available from an earlier stage in the pandemic, no one gave an account that the lessons had been understood and would be applied to other decisions during the future course of the pandemic which were relevant.

Apart from the clinical purpose of identifying for isolation and medical attention of those infected with COVID-19, the retreat to testing only hospital patients for the virus drastically curtailed the ability to gather data that could have identified the spread of the virus among different groups and with different symptomatic severity.

The Office for National Statistics is now conducting a very important sampling exercise in which data on the prevalence of COVID-19 in the UK population will be gathered and reported twice-weekly. It is of great importance in providing data on the spread of diseases, its impact on the different demographic groups and geographies, the incidence of asymptomatic transmission and even the Reproduction or 'R' number which the Government has made key to easing some social distancing restrictions. In evidence to the Committee, the National Statistician, Sir Ian Diamond, gave an impressive account of the speed in which his team had been able to organise and implement a significant testing programme.

Sir Ian said:

The fact that we came into it on a Thursday and, with the University of Oxford, put together the design and protocol [...] and put it to medical ethics the following Monday and data ethics on Tuesday, with letters out to potential participants on the Wednesday, seems to me to be one of the most rapid surveys I have ever in my life seen go into the field.³¹⁵

However, Sir Ian also told the Committee that the request to put together such a testing programme was made only on 17 April.

It is not clear why such a study could not have been instigated by the Government at a much earlier stage. Indeed, had this study been in operation even a month earlier, many of the decisions that will be made on social distancing during the days and weeks ahead may have been made earlier, based on much more detailed data. With early estimates of

the impact on the economy of the lockdown running at over £17 billion a week,³¹⁶ there seems to be insufficient recognition that an avoidable delay in being able to take decisions because of the lack of data has an impact that is vastly greater the cost of the data collection exercise. In particular, the intended use by the Government of current estimates of the Reproduction number ('R') depends, as well as on modelling assumptions that should be open to be examined, on the depth and breadth of the data available to estimate it.

Being able to operate at scale at, or in advance of, the point of need is a key lesson from the testing experience and will have a particular relevance to vaccination, which we discuss in finding 9 below.

Recommendation 5: The Government should learn and apply the lessons from the slowness of the provision of testing capacity and take every opportunity to build capacity in advance of need to surge capacity explosively rather than follow a more gradual “ramping up” approach.

Finding 6: Strategies to deal with carriers of COVID-19 who were asymptomatic have not been clear.

One of the consequences of the small capacity for testing has been that the test has until recently been largely reserved for people suffering from suspected symptoms of COVID-19.

Yet evidence presented to the Committee has raised the prospect that a high proportion of people with COVID-19—and therefore capable of transmitting it to others—are free of all symptoms.

Professor Xihong Lin of Harvard University said

In our paper, we analysed that about 60% to 80% of daily new cases were asymptomatic. This was very interesting. A New England Journal of Medicine article was published earlier this week. In that study, they tested pregnant women in New York City. Among 215 pregnant women who tested positive, 85% were asymptomatic. Yesterday in the news there was a report on Boston homeless shelters: among a couple of hundred people who were tested, all those who tested positive were asymptomatic.³¹⁷

The possibility of significant levels of asymptomatic transmission have a profound consequence for the management of the pandemic.

If people have no means of knowing they are infected, then they risk transmitting the infection to large numbers of people if they are not rigorously socially distanced. This is a particular concern for NHS workers and care workers who may be asymptotically infected and transmitting the disease to vulnerable people with whom they are in close contact.

A significant degree of asymptomatic infection may require regular testing in particular settings—like hospitals and care homes—of all workers who come into contact with vulnerable groups, whether or not they display symptoms themselves.

316 Centre for Economics and Business Research, 'Estimates of daily economic impact of the UK's lockdown by sector', published 6 April 2020

317 Q229

Recommendation 6: The Government should explicitly set out its approach to managing the risk of asymptomatic transmission of the disease.

Finding 7: In combination with other measures, contact tracing can help to reduce the spread of disease. The UK’s limited capacity for contact tracing was an important factor in the decision to stop full contact tracing on 12 March.

Rigorous contact tracing has been used in several countries that have reported low death rates from COVID-19, such as the Republic of Korea, Singapore and Hong Kong. Professor Chris Whitty told the Committee that contact tracing was a “very powerful tool of public health”, but that it was “unbelievably labour intensive” if done manually.³¹⁸ Although Professor John Newton gave the Committee his opinion that contact tracing would have been stopped once there was widespread transmission in the UK regardless of capacity,³¹⁹ many of our expert witnesses acknowledged that limited testing and tracing capacity was a factor in the decision to stop contact tracing. For example, Professor Neil Ferguson said on 25 March:

If we have to transit from the suppression strategy and the lockdown strategy to something this country can maintain long term, undoubtedly much more widespread testing, contact tracing and other methods will have to be deployed. If we are talking about back in January/February/ early March, it was very clear from messages from Public Health England that we would have nowhere near enough testing capacity to adopt that strategy.³²⁰

With respect to easing lockdown restrictions, Professor Jonathan Edmunds, of the London School of Hygiene and Tropical Medicine, explained that contact tracing would “play a role” in managing the epidemic, but would require some social distancing measures to remain in place.³²¹ He made clear that the point at which effective contact tracing would become feasible was an “operational decision” and would depend on the capacity for tracing and isolation in relation to the numbers of cases.³²²

We also heard that multiple approaches may be required towards managing the manual burden of contact tracing, including the use of new technologies. Professor Christophe Fraser told us that the use of digital contact tracing applications would be necessary to manage the spread of COVID19 as manual efforts would be “unlikely to be quick enough” to inform those who might be infected.³²³ Nevertheless it is clear from the experiences of other countries, such as Singapore,³²⁴ that we cannot rely on the use of a contact tracing application to fulfil our needs. Indeed, Matthew Gould, the Chief Executive Officer of NHSX—which is developing the app—indicated to us that achieving the levels of uptake required for this approach to be optimal would be “tough”.³²⁵ Therefore it is critical that the capacity for contact tracing is advanced for future stages of managing the epidemic.

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322 Qq416 and 418

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Recommendation 7: The Government must urgently build up contact tracing capacity in order to facilitate further easing of social distancing measures as soon as possible, while minimising the risk of a second peak in infections.

Finding 8: The role of isolation in combination with testing and tracing has been important in countries which have, so far, tackled the pandemic effectively.

The Committee has taken substantial evidence on how other countries have managed the pandemic, including leading experts from around the world.

The consistent message from all of these witnesses was that not only is testing and contact tracing foundational to effective management but so is an extensive programme of isolating and managing infected persons.

Professor Gabriel Leung of Hong Kong University emphasised the importance of quarantine and isolation in testing, tracking and tracing the virus in Hong Kong:

every single infected individual who is confirmed by testing goes into a hospital bed. In fact, up until very recently, almost all of them would go into a negative pressure single room. All their close contacts who are identified by contact tracing are then quarantined in an isolated facility that is separately and specially prepared for such a purpose. There is no home quarantining for close contacts of confirmed cases.³²⁶

Dr Erica Lee of the Korea Centers for Disease Control and Prevention confirmed that the Republic of Korea had been using “isolation and quarantine measures”.³²⁷ Dr Lee also explained how Korea changed its approach to respond to rising cases so that there were categories of quarantine:

If they have severe symptoms and they need the treatment, we transport them to either the negative pressure rooms or the tertiary hospitals designated by the Government. If the symptoms are mild, we have designated living and treatment facilities, so they can stay there in isolation and if they become severe, we transport them to the hospitals right away. If they have light symptoms or they are asymptomatic cases, we sometimes recommended that they stay home in isolation.³²⁸

Professor Xihong Lin of the Harvard T.H. Chan School of Public Health emphasised the important role of quarantine and isolation:

social distancing, testing and contact tracing greatly help in reducing the transmission but they are not enough, based on analysis of the Wuhan data and other countries. Smart isolation and quarantine, such as the centralised quarantine and isolation used in Wuhan, is needed to bend the curve in a timely fashion.³²⁹

Without developed, extensive and operational testing and tracing capacities targeted isolation of infected individuals is difficult to achieve. However, when testing and tracing

326 Q112

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328 Q114

329 Q210

has reached a dependable level and cases have fallen to a low enough level, other countries have found that dedicated facilities to isolate and treat infected people has been important in keeping cases very low. These include designated hospitals and non-clinical facilities such as requisitioned hotel accommodation.

While intrusive, and incurring cost, providing dedicated facilities may be worthwhile when set against the more hidden but vastly greater cost of maintaining tighter restrictions on the rest of the population for longer if infected individuals are less rigorously isolated from society.

Recommendation 8: The Government should set out the role of isolation and quarantine as part of its test, track and trace strategy, ensuring that it draws on the experiences of other countries.

DEVELOPMENT OF VACCINES

Finding 9: The development and deployment of vaccines could be critical to halting the COVID-19 pandemic. It is encouraging news that the first human trials of potential vaccines are now underway in the UK.

The Secretary of State for Health and Social Care announced on 21 April that human trials of a potential vaccine for COVID-19 would start on 23 April.³³⁰ This is testament to the UK's expertise in this area and the hard work of the researchers involved and those supporting them. Professor Sarah Gilbert, who is part of the Oxford team developing a vaccine, has said that she is "very optimistic" of a successful vaccine, which is a particularly encouraging assessment.³³¹

We took evidence from Professor Andrew Pollard, of the University of Oxford, and Dr Melanie Saville, Director of Vaccine Research and Development at the Coalition for Epidemic Preparedness Innovations (CEPI), both of whom made clear the need to start the manufacture of potential vaccines before their effectiveness is proven in order for any successful vaccine to be available at scale as soon as possible.

Dr Saville stressed the importance of investing in manufacturing capacity at an early stage and explained the work that CEPI was undertaking in this regard:

to reach a 12 to 18-month timeframe many activities need to be done in parallel and at risk. With manufacturing, you do not usually scale up your process until you have clinical data. One of the approaches that CEPI is taking in terms of funding is to accelerate the scale-up of manufacturing so that it is done even at pre-clinical phases.³³²

Professor Pollard explained that if investment at risk in manufacture of a COVID-19 vaccine did not take place until all trials were completed then the UK would be "years and years away" from having a vaccine that could be ready for mass use.³³³

330 <https://www.gov.uk/government/speeches/health-and-social-care-secretarys-statement-on-coronavirus-covid-19-21-april-2020>

331 See for example: <https://www.bbc.co.uk/news/health-52394485>

332 Q50

333 Q53

Clearly no vaccine may be used (other than in trials) before its effectiveness and safety is assured. However, to wait until all trials are completed in order to build up the capacity to manufacture and distribute vaccines could lose valuable time. Therefore, even at the risk of redundancy, it is imperative to ensure that the UK has built up sufficient manufacturing and distribution capacity to roll-out a vaccine as soon as its effectiveness is proven.

Recommendation 9: The Government should build capacity for vaccine manufacture and deployment now in advance of need and so that their mass use can start as soon as their safety is proven.

RECORDING ETHNICITY

Finding 10: There are significant unexplained differences in the death rates in the UK of Black, Asian and minority ethnic groups compared to the population as a whole.

NHS England publishes a breakdown of COVID-19 deaths by ethnicity,³³⁴ which is dependent upon such information being recorded in emergency department, in-patient or out-patient datasets, and is unavailable for almost 10% of such cases. Further, it does not cover those who die outside of an NHS setting, for example in care homes.

Professor Chris Whitty, told us that there was “pretty clear evidence that there is over-representation, at least in certain areas, of people from BAME backgrounds in the number of people who get into severe difficulties” with COVID-19, but that the reason for this was not clear.³³⁵ Further, an analysis from the Institute for Fiscal Studies identified that “data published by NHS England on registered hospital deaths by ethnic group have confirmed stark inequalities between ethnic groups”. It explained that:

among the black Caribbean and ‘other’ (which includes the Arab population) groups, per-capita hospital deaths are close to three times those of the white British majority, and the ‘other black’ group has also recorded a disproportionate number of hospital deaths.³³⁶

Analysis published by the Office for National Statistics (ONS) on 7 May made similar findings: “After adjusting for age [...], men and women from all ethnic minority groups (except females with Chinese ethnicity) are at greater risk of dying from COVID-19 compared with those of White ethnicity”.³³⁷

Professor Whitty made clear to us on 24 April that the cause for BAME over-representation in those people “who get into severe difficulties with this disease” was not known.³³⁸ The ONS analysis identified some of the reasons for the difference in outcomes, and found “that the difference between ethnic groups in COVID-19 mortality is partly a result of socio-economic disadvantage and other circumstances, but a remaining part of the difference has not yet been explained”.³³⁹

334 ‘COVID-19 Daily Deaths’, NHS England

335 Q284

336 <https://www.ifs.org.uk/inequality/chapter/are-some-ethnic-groups-more-vulnerable-to-covid-19-than-others/>

337 <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/coronavirusrelateddeathsbyethnicgroupenglandandwales/2march2020to10april2020>

338 Q284

339 <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/coronavirusrelateddeathsbyethnicgroupenglandandwales/2march2020to10april2020>

Professor Whitty explained that he had requested Public Health England and academic input to try and establish why there was this over-representation:

I have asked Public Health England to look seriously at any datasets, because it is a major concern. In the National Institute for Health Research, we have put out a call for our academic colleagues also to look at it.³⁴⁰

It was also highlighted to us that data on the ethnicity of those dying from COVID-19 was not systematically collected. Professor Whitty argued that ethnicity and gender should be recorded “much more systematically”³⁴¹ in a wide variety of data sources to facilitate monitoring and research into health impacts related to such characteristics. Dr Frank Atherton, Chief Medical Officer for Wales, similarly agreed that “more data is needed”.³⁴²

Recommendation 10: The Government should consider how ethnicity data on those dying as a result of COVID-19 could be systematically recorded.

The Science and Technology Committee hopes that these initial findings and recommendations will be useful as a constructive contribution to the important and difficult decisions you and your colleagues in Government have to make during the weeks ahead.

As we continue to take evidence during the remaining course of this pandemic the Committee will, in the same spirit, write to you with further observations based on what we learn.

I am copying this letter to the Secretary of State for Health and Social Care, the Chief Medical Officer for England and the Government Chief Scientific Adviser. I will be placing this letter in the public domain.

With best wishes,

Rt Hon Greg Clark MP

Chair

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Conclusions and recommendations

Expert advice and Government decision-making structures

1. The coronavirus pandemic marks the most significant test of the UK's emergency advisory and decision-making structures in living memory. As such, it is important that lessons are drawn throughout and applied so that the Government and future Governments may be better placed to respond to future crises. This has been the purpose of our inquiry—to capture those early lessons in the course of the pandemic. The machinery of science advice and decision-making has evolved throughout the Government's management of the covid-19 pandemic, however there is an open question regarding the long-term sustainable and efficient provision of science advice to Government. Further, it remains unclear—in the long term—what role the Scientific Advisory Group for Emergencies (SAGE) will play, and—as alluded to by the Government Chief Scientific Adviser—how organisations such as the Joint Biosecurity Centre will provide a solution to the provision of science advice to Government in the coronavirus pandemic and beyond. We are concerned that at the present time the operation of the Joint Biosecurity Centre and the advice that it gives is not fully transparent. *The Government, whatever organisational structures it decides upon, should commit to publishing the scientific advice it receives unless there are matters of national security (see paragraphs 59 to 64). The Government should outline in response to this Report how it intends for science advice on the novel coronavirus to operate in the longer-term management of the pandemic and what roles will be played by new bodies including the National Institute for Health Protection and the Joint Biosecurity Centre, alongside SAGE.* (Paragraph 33)
2. *The Cabinet Office and Government Office for Science should update SAGE guidance to set out the role that SAGE will play in advising the Government's long-term management of emergency scenarios.* (Paragraph 34)

Activation and operation of SAGE

3. We are satisfied that the SAGE mechanism responded to the advent of the novel coronavirus in a timely manner and that the most up-to-date scientific research and understanding was readily available to inform the Government from the outset. Nevertheless, we note that submissions presented to us raised concerns that during the early weeks of the pandemic, policy decisions in response to scientific evidence were taken more slowly than was needed, given the rapidity of the spread of the virus. (Paragraph 43)
4. It is disappointing that the details of SAGE's preliminary meetings were not made public for over two months, leading to unnecessary concern and confusion over what advice the Government had been receiving. Indeed, were it not for our early enquiries, this confusion may have continued until the details of SAGE's initial meetings were published at the end of May. We note that SAGE has yet to publish any papers that might have been considered in its first two meetings. *The Government*

Office for Science should confirm, as soon as possible, whether any papers were considered at the first two SAGE meetings and, if so, it should place them in the public domain. (Paragraph 44)

5. We believe the initial response in setting up SAGE was timely. We have heard from some sectors of the science community that the community was not consulted appropriately. *The Government should set out in response to this Report how in future emergencies it will engage formally and informally with the community. (Paragraph 45)*
6. SAGE has been activated for the longest continual period since its inception, which brings to question how sustainably the group can maintain its current level of high activity. We acknowledge senior scientists' comments of frequent working round the clock, and we pay tribute to their continued service to the public throughout this emergency. It is also important to be clear that it is not just the participants of SAGE, and its sub-groups, who are managing this workload—it is shared by the colleagues, junior researchers and technicians who support them, too, as well as Government officials, among others. *The Cabinet Office and the Government Office for Science should commit to update SAGE guidance to consider what support might be required for independent advisers in long-term emergency scenarios, within six months of SAGE being deactivated. The Government should identify a way to formally recognise and celebrate all those who have contributed to the UK scientific response to the pandemic. (Paragraph 51)*

Transparency and communication

7. Whilst we welcome the eventual disclosure of SAGE participants, the fact that the delay was attributed to advice from the Centre for the Protection of National Infrastructure (CPNI) gives us cause for concern. As suggested by Professor Chris Whitty, the advice relates to emergencies relevant to national security rather than public health crises. We therefore conclude that it was not necessary for CPNI advice to have resulted in a delay in the public disclosure of SAGE participants of over three months. *Within three months of this Report, the Cabinet Office should update SAGE guidance to stipulate the timeframes in which SAGE should receive advice from the Centre for the Protection of National Infrastructure, and other relevant bodies, regarding the public disclosure of expert SAGE participants. (Paragraph 56)*
8. Regarding the disclosure of Government officials observing SAGE meetings, we agree with the redaction of information to protect the personal data of individuals including junior officials at the time of the emergency. In the interests of transparency, and to have a full picture of who is formulating policy advice to Government during the course of the pandemic, it is important that the identities of senior officials and political advisers attending SAGE meetings are made public. We also note that the minutes of previous SAGEs activated for other emergencies were eventually published with full disclosure of all participants and observers. *In response to this Report, the Government should commit to the full disclosure of the following information on SAGE attendees and observers throughout the pandemic:*
 - (1) Civil servants at Senior Civil Service grade;

- (2) *political and special advisers; and*
- (3) *the representative Government departments and job title of junior officials, in lieu of their names.*

Further, the Government should commit to the full disclosure of all individuals who attended SAGE meetings—and their affiliations—within three months of the current SAGE being stood down, or by the end of 2021, whichever is the earlier. (Paragraph 57)

9. It is regrettable that full transparency was not achieved in time for the JBC's inauguration on 1 June. We welcome the disclosure of the expert advisory boards supporting the JBC. Nevertheless, the Department of Health and Social Care (DHSC) has yet to commit to publish the outputs, including meeting papers and minutes, of all the JBC's established boards. It would appear that the Government has not learned fully from the public concern resulting from the initial delays in publishing SAGE information. *The Department of Health and Social Care should commit, within a month of this Report, to publish the relevant outputs—including terms of reference, meeting papers and meeting minutes—of the steering and advisory boards supporting the JBC. DHSC should also set out how regularly these boards will meet and when relevant papers can be expected to be in the public domain—preferably within a fortnight of each meeting. (Paragraph 64)*
10. Given the frequent reporting of the views of SAGE advisers in the media—particularly where these have diverged from decisions taken by the Government—and the continued public interest in the evidence base underlying decisions made, we are satisfied for the most part that the demarcation between adviser and decision-maker has remained intact. If we are to fully understand the extent to which the Government has been guided by scientific and medical expertise, then we must see the science advice that is reflected in the papers and meeting minutes published by SAGE. This advice must also be taken in the context of other advice and evidence submitted to Government—only then will the full justification for the Government's actions be understood. *The Government should publish the science advice given by the Government Chief Scientific Adviser and Chief Medical Officer for England to COBR and the Prime Minister to date, and commit to the disclosure of future SAGE advice within two months of it being given, or the policy being decided, whichever is the later. (Paragraph 69)*
11. Transparency in the evidence behind Government decisions enables higher quality decision-making through scrutiny, and better understanding of the reasons for those decisions. While calls for the publication of SAGE evidence from this Committee and many others were eventually heeded, it is regrettable that a significant amount of time passed before a regular publication rhythm was established. However, we acknowledge that in emergencies, where evidence is subject to great uncertainty, careful thought must be given to the way information is communicated and presented, given the context at the time. During those crucial early weeks of the pandemic—in which important decisions were made by the Government—public understanding and scrutiny was hampered by a lack of transparency. For example, when details of the 16 March Imperial College report were made public, it was not known what other evidence was being considered by SAGE and the Government. It is regrettable that a repeat of this scenario occurred on 31 October, ahead of the

second national lockdown in England, where there was a delay in publishing the data behind the modelling used by SAGE. Presenting a graph to the public including a scenario of 4,000 deaths per day—based on out-of-date information and without a clearly marked source—risked, as indicated by the Office for Statistics Regulation, causing public confusion and undermining confidence in the statistics, and in our view, causing public alarm beyond what was justified. We agree with the assessment of the Office for Statistics Regulation and urge the Government and its advisers to ensure that analysis selected for public presentation meets high standards of rigour and relevance. (Paragraph 86)

12. It has been made clear to us that policy decisions throughout the coronavirus pandemic have not been based solely on medical and epidemiological science, but rather have been developed with a wide range of inputs that include scientific research and opinion. Nevertheless, as indicated by the Government Chief Scientific Adviser, while the scientific analysis informing the Government's interventions has enjoyed a great level of public exposure, the analysis and advice outside of SAGE (including economic and social considerations) have been "less visible". It is disappointing that the Treasury had "not done a specific prediction or forecast of the restrictions" implemented, or those not pursued, but rather provided an "ongoing analysis" of economic factors, despite SAGE indicating that social and economic impacts should factor into such decisions. It is understandable that these analyses are subject to significant uncertainty, however by analogy the epidemiological modelling published by SAGE, too, is uncertain and should not be interpreted as a strict predictor of what will happen. *The Government should, as a matter of urgency, publish the advice it has received on the potential indirect covid-19 impacts (e.g. economic, social and other health impacts) of the interventions it has undertaken, alongside the evidence base for that advice and should continue to commission such research.* (Paragraph 87)
13. *The public has shown a strong appetite for more information. The Government should attempt to quantify the four forms of health impacts identified by Professor Whitty. Further, it should consider whether it is possible to provide an analysis of—either consistently or on a sample basis—those who died with covid-19 as distinct from those who died from covid-19.* (Paragraph 88)
14. As indicated by the Chief Medical Officer for England, the SAGE secretariat faced "huge pressure" in managing the monumental task of organising SAGE whilst adhering to the principles of transparent and scrutable scientific advice. We commend the efforts of officials in the Government Office for Science, the SAGE secretariat and independent advisers in their efforts to establish a regular rhythm of publicly available information, and hope that this is taken forward as a key learning for future emergencies. *The Cabinet Office should work alongside the Government Office for Science to update SAGE guidance to incorporate the lessons learned for managing transparency during emergencies, taking account of:*
 - a) *the potential volume of information;*
 - b) *the publication and communication of non-peer-reviewed research informing SAGE;*
 - c) *the potential length of time over which SAGE is activated; and*

d) *the potential impacts on public trust.* (Paragraph 89)

15. We applaud the dedication with which the scientific community within the UK and globally have directly engaged with the public, in addition to their intensive studies of the coronavirus itself. We are also grateful to those within universities and research institutes for their efforts in supporting the clear and direct communication of the science of covid-19. These efforts have helped ensure that the trust of the British public in the strength of independent science advice has remained high during the pandemic, and we hope that these efforts are supported so that they may continue. We note, however, that a balance needs to be achieved so that Government decisions are not seen to be entirely science-led. *The Government Office for Science should work with Government departments and public bodies, such as UK Research and Innovation, to identify the lessons to be learned from the Government's communication of science—drawing also upon the experiences of researchers and their respective institutions. These lessons should be reflected within updated SAGE guidance, including a consideration of the support that SAGE participants may require for effective public communication and engagement during emergencies.* (Paragraph 90)

Nature of the scientific advice to Government

16. We believe that a gap persists in the transparency of the advice that is given to the Government, outside of the auspices of SAGE, particularly on the topic of non-medical impacts of the pandemic and related Government interventions. While this Committee is not advocating the establishment of an “economics SAGE”, we do note that SAGE’s remit covers the inclusion of numerous disciplines, including “scientific, technical, economic and legal” expertise. Further, it is entirely within the gift of SAGE to establish sub-groups to draw in other expertise as necessary. Whilst we have been assured that a Treasury official has been present at SAGE meetings, it has been stressed to us that SAGE does not issue economic advice and thus such advice must be received by Government through other avenues. *The Government must, in response to this Report, set out how advice to central Government on the indirect effects (for instance impacts on mental health and social wellbeing, education and the economy) of covid-19, and the Government's policy response to it, has been structured throughout the pandemic, and commit to the public disclosure of the individuals and institutions from which it has sought such advice and publication of relevant papers.* (Paragraph 100)
17. Given the UK’s strengths in statistical analysis and data science, it is regrettable that poor data flows, delays in data-sharing agreements and a general lack of structuring and data integration across both the health and social care sectors have throttled timely data sharing and analysis. For example, it is unacceptable that detailed public health data was only made available to modellers from March. The potential consequences of this will undoubtedly include slower and less effective decision-making. The establishment of the Joint Biosecurity Centre as an effort to centralise data flows to manage the pandemic gives some hope, although it is unfortunate that no central mechanism to coordinate data was in place at the start of the pandemic. However it will only be successful in this mission if it learns from the issues encountered in the early stages of the pandemic, such as those raised to us by SAGE, representatives of the health and social care sector and the academic and research

community. *In response to this Report, the Department of Health and Social Care (DHSC) should set out an action plan that describes what efforts have been made, and will be made during the pandemic, to address the poor data access issues raised by the scientific community and SAGE and its sub-groups, including a consideration of:*

- i) *agreements and incentives for data sharing;*
- ii) *integration of data flows across the health and social care sectors, including public health bodies at the national and local levels; and*
- iii) *integration of data flows across the health and social care systems of the four UK nations.*

DHSC should also describe what role the Joint Biosecurity Centre will be given to make best use of such data flows and outline what support it will receive to achieve this. (Paragraph 109)

18. We are satisfied that the science advice informing the Government has drawn upon some of the best expertise that the UK—and indeed the world—has to offer. We acknowledge the initial dominance of modelling expertise on SAGE and believe this is a fair reflection of the lack of data at the beginning of the pandemic. We also note comments from the Secretary of State for Health and Social Care that SAGE expertise was broad enough and that advice from some disciplines—such as engineering—was given “quite separately”. We also appreciate that sub-groups and other advisory structures exist that may feed into Government decision-making, and that the composition of SAGE has evolved to incorporate a wider range of disciplines. (Paragraph 110)

Application of science expertise

19. The Government was too slow to increase testing capacity to the levels required to help contain the spread of the coronavirus. We have previously suggested that strategy was driven by the capacity available, rather than strategy driving the necessary increase in capacity. It was clear early in the year that Public Health England was not set up for the mass scale necessary for coronavirus testing. This lesson had previously been learned by countries who dealt with the MERS outbreak of 2015, and it is regrettable that it is a lesson that the UK did not heed in advance of the pandemic. (Paragraph 137)
20. The Government was slow to move once it realised that coronavirus testing required a rapid expansion and did not engage sufficiently with the wide array of scientific expertise available within the UK—particularly within our universities and research institutes. While we appreciate the complexities of such a feat, including the need to ensure health and safety guidelines are adhered to, it does not justify that many researchers who were willing and able to contribute went unheard. An overt initial focus on boosting capacity within established structures—namely PHE and NHS laboratories—clouded the exploration of a more decentralised avenue, such as that clearly employed by the Republic of Korea. As such, a significant and foreseeable opportunity was missed to prepare the UK for a potential pandemic situation. (Paragraph 138)

21. The Committee will report separately and more fully on the test, trace and isolate system and the mass testing programme in due course. But in considering the role of science advice, and its influence on Government decisions, we are concerned by the continued lack of justification provided to the Committee by Public Health England for taking an initial centralised approach, and why a more decentralised approach—drawing, for example, on the experience of the Republic of Korea—has not been followed. (Paragraph 139)
22. The creation of NHS Test and Trace involves a budget of £22 billion for financial year 2020–21 and the justification for most of its spending being on the central part of the system, rather than through local public health teams, has not been clearly made. Concerns have also been raised about the inability of local public health teams to access timely information. This is particularly concerning given SAGE’s conclusion in September that the system, at that time, was “having a marginal impact on transmission”. (Paragraph 140)
23. *The Government should: explain clearly the justification for taking a relatively centralised approach to test, trace and isolate; set out its assessment of the impact of the system on the spread of the virus since the outset, including on health outcomes; and review the balance between the local and national components of the system, including its value for money and effectiveness. The Government should set out the rationale and justification for, as the National Audit Office put it, the “unusual organisational relationship” that NHS Test and Trace has with the Department of Health and Social Care.* (Paragraph 141)
24. Throughout the pandemic, the UK has relied on its own bespoke system of science advice and guidance on non-pharmaceutical interventions, while at the same time global-level guidance has been issued regularly by the World Health Organisation (WHO). There have also been numerous opportunities to learn from the approaches undertaken by nations around the world. The UK’s policies on areas such as testing and tracing, the two-metre rule and the use of face coverings suggest that the Government’s approach has been to carve its own path between SAGE and WHO advice. We have heard that a “precautionary” approach was taken to social distancing in the UK—based on SAGE guidance—above the World Health Organisation’s recommendation of “at least 1 metre”. However, on face coverings a precautionary approach was not employed, and SAGE’s recommendations were not taken up until two months after they were made. In general, more lessons could have been applied from the experiences of other countries, particularly those which have dealt with previous coronavirus outbreaks (e.g. SARS and MERS). *The Government should commit to review—before the end of 2021—the relationship between SAGE and expert advisory structures in other countries and the World Health Organisation, to understand where knowledge sharing may be improved during future emergencies.* (Paragraph 149)
25. Given the importance of refining interventions to mitigate both impacts on public health and economic recovery, a review of social distancing measures came quite late. While the scientific approach quite rightly waits for the evidence before making a definitive recommendation, this often necessitates delay and may not produce conclusive results. The pandemic has demanded that policy be made and adapted on a faster timescale and in this instance the Government was too slow to respond.

The Government should employ a more adaptive approach to non-pharmaceutical interventions such as social distancing rules and commit to a review of the approach employed in the UK as compared with countries that dealt with the SARS and MERS outbreaks (such as the Republic of Korea), setting out the reasoning for differences in policy decisions. The outcome of this review should be published by the end of 2021. (Paragraph 150)

26. The development of vaccines and therapeutics is a policy area in which it is right that science must lead the way, so that there may be a high level of confidence that a rigorous approach has been taken towards safety and efficacy. From the beginning of the pandemic, the clear advice from experts was that significant investment and resource, at risk of failure, was required on many fronts to maximise the potential for success. The Government listened to this advice and we applaud the speed at which the Government implemented support for research and clinical trials, and took steps to secure the manufacture and procurement of potential vaccines. (Paragraph 158)
27. We acknowledge that a large part of the success to date into the development of covid-19 vaccines and therapeutics can be credited to lessons learned from previous outbreaks and efforts made to prepare for future crises. As further promising vaccine candidates and treatments come to light, other aspects of the Government's pandemic preparedness, such as the logistics of a mass vaccination campaign, will be tested. (Paragraph 159)

Formal minutes

Friday 24 April 2020

Mark Logan declared the following interest: he has a 50% beneficial share in Carnmoyne Private Residential home, Northern Ireland.

Thursday 17 December 2020

Members present:

Greg Clark in the Chair

Aaron Bell	Andrew Griffith
Dawn Butler	Carol Monaghan
Chris Clarkson	Graham Stringer
Katherine Fletcher	Zarah Sultana

Draft Report (*The UK response to covid-19: use of scientific advice*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 159 read and agreed to.

Annex and Summary agreed to.

Resolved, That the Report be the First Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available (Standing Order No. 134).

[Adjourned till Tuesday 12 January at 10.45am.]

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the [inquiry publications page](#) of the Committee's website.

Wednesday 25 March 2020

Professor Neil Ferguson, Director, MRC Centre for Global Infectious Disease Analysis, Imperial College London [Q1–37](#)

Dr Richard Horton, Editor-in-Chief, The Lancet Panel [Q38–46](#)

Dr Melanie Saville, Director of Vaccine Research and Development, Coalition for Epidemic Preparedness Innovations; **Professor Andrew Pollard**, Professor of Paediatric Infection and Immunity, University of Oxford [Q47–73](#)

Sir Patrick Vallance, Government Chief Scientific Adviser [Q74–111](#)

Professor Sharon Peacock, Director of the National Infection Service, Public Health England [Q112–144](#)

Wednesday 8 April 2020

Professor Gabriel Leung, Chair, Public Health Medicine, Hong Kong University; **Dr Seon Kui Lee**, Director, Division of Risk Assessment and International Cooperation, Korea Centers for Disease Control and Prevention (KCDC) [Q145–155](#)

Steve Bates, Chief Executive Officer, Bioindustry Association; **Sir Paul Nurse**, Director and Chief Executive, Francis Crick Institute [Q156–172](#)

Professor John Newton, Adviser on increasing Covid-19 testing capacity, HM Government; **Kathy Hall**, Director of Covid-19 testing strategy, Department of Health and Social Care; **Professor Stephen Powis**, National Medical Director, NHS England [Q173–211](#)

Thursday 16 April 2020

Professor Graham Medley, Professor of Infectious Disease Modelling, London School of Hygiene and Tropical Medicine; **Dr James Rubin**, Reader in the Psychology of Emerging Health Risks, Kings College London [Q212–247](#)

Professor Xihong Lin, Professor of Biostatistics, Harvard T.H. Chan School of Public Health; **Professor Dr. Clemens Fuest**, President, German Institute for Economic Research; **Professor Dr. Herwig Ostermann**, Executive Director, Austrian Public Health Institute [Q248–268](#)

Friday 24 April 2020

Dr Frank Atherton, Chief Medical Officer for Wales; **Dr Michael McBride**, Chief Medical Officer for Northern Ireland; **Dr Gregor Smith**, Interim Chief Medical Officer for Scotland; **Professor Chris Whitty**, Chief Medical Officer for England, Chief Scientific Adviser, Department of Health and Social Care; **Pete Wishart MP**, Chair-Elect, Scottish Affairs Select Committee [Q269–339](#)

Tuesday 28 April 2020

Professor Danny Altmann, Professor of Immunology, Imperial College London, Spokesperson, British Society for Immunology; **Professor Susan Michie**, Professor of Health Psychology, University College London

[Q340–371](#)

Matthew Gould CMG MBE, Chief Executive Officer, NHSX; **Professor Lilian Edwards**, Professor of Law, Innovation and Society, Newcastle Law School; **Professor Christophe Fraser**, Senior Group Leader in Pathogen Dynamics, University of Oxford Big Data Institute

[Q372–422](#)

Thursday 7 May 2020

Professor Sir Ian Diamond, National Statistician; **Professor John Edmunds OBE**, Professor of Infectious Disease Modelling, London School of Hygiene and Tropical Medicine

[Q423–457](#)

Professor David Peters, Chair of the Department of International Health, John Hopkins University; **Professor Sir David Spiegelhalter**, Chair of the Winton Centre for Risk and Evidence Communication, University of Cambridge

[Q458–488](#)

Wednesday 13 May 2020

Professor Alan Penn, Chief Scientific Adviser, Ministry of Housing, Communities and Local Government; **Osama Rahman**, Chief Scientific Adviser and Director of Analysis, Department for Education

[Q489–540](#)

Professor Phil Blythe, Chief Scientific Adviser, Department for Transport; **Professor John Aston**, Chief Scientific Adviser, Home Office

[Q541–624](#)

Friday 22 May 2020

Professor John Newton, Director of Health Improvement, Public Health England; **Professor Yvonne Doyle**, Medical Director and Director for Health Protection, Public Health England

[Q625–704](#)

Professor Andrew Curran, Chief Scientific Adviser, Health and Safety Executive; **Professor Catherine Noakes**, Professor of Environmental Engineering for Buildings, University of Leeds

[Q705–757](#)

Friday 5 June 2020

Professor Carol Propper, Professor of Economics, Imperial College London; **Professor John Kay**, Economist and Fellow in Economics, St John's College, University of Oxford; **Professor James Poterba**, Mitsui Professor of Economics, Massachusetts Institute of Technology

[Q758–787](#)

Professor John Loughhead, Chief Scientific Adviser, Department for Business, Energy and Industrial Strategy; **Phillip Duffy**, Chief Scientific Adviser, HM Treasury

[Q788–821](#)

Wednesday 10 June 2020

Professor Mark Woolhouse OBE, Professor of Infectious Disease Epidemiology, University of Edinburgh; **Professor Johan Giesecke**, Former State Epidemiologist for Sweden and Professor Emeritus, Karolinska Institute

[Q822–865](#)

Professor Neil Ferguson, Professor of Mathematical Biology, Imperial College London; **Professor Matt Keeling**, Professor of Mathematics and Life Sciences, University of Warwick; **Dr Nicholas Davies**, Research Fellow in Mathematical Modelling, London School of Hygiene and Tropical Medicine

[Q866–943](#)

Wednesday 1 July 2020

Professor Sarah Gilbert, Professor of Vaccinology, University of Oxford; **Kate Bingham**, Chair, UK Government Vaccine Taskforce; **Professor Sir John Bell**, Regius Professor of Medicine, University of Oxford

[Q944–994](#)

Professor Jonathan Van-Tam, Deputy Chief Medical Officer and Lead, UK Government Therapeutics Taskforce, Department of Health and Social Care; **Dr Jonathan Sheffield**, COVID-19 Research Operations Director, National Institute for Health Research

[Q995–1036](#)

Thursday 16 July 2020

Sir Patrick Vallance, Government Chief Scientific Adviser

[Q1037–1159](#)

Tuesday 21 July 2020

Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care, Department of Health and Social Care; **Sir Chris Wormald**, Permanent Secretary, Department of Health and Social Care

[Q1160–1258](#)

Thursday 17 September 2020

Professor Carl Heneghan, Professor of Evidence-Based Medicine & Director, Centre for Evidence-Based Medicine, University of Oxford; **Dr Thomas Waite**, Director, Health Protection, Joint Biosecurity Centre; **Professor Sylvia Richardson**, Director, MRC Biostatistics Unit, Cambridge Institute of Public Health, University of Cambridge

[Q1259–1291](#)

Baroness Harding of Winscombe, Interim Executive Chair, National Institute for Health Protection; **Simon Thompson**, Managing Director of the NHS COVID-19 App, NHS Test and Trace; **Dr Susan Hopkins**, Chief Medical Advisor, NHS Test and Trace; **Lord Bethell**, Parliamentary Under-Secretary of State, Department of Health and Social Care

[Q1292–1432](#)

Tuesday 3 November 2020

Professor Chris Whitty, Chief Medical Officer for England; **Sir Patrick Vallance**, Government Chief Scientific Adviser; **The Lord Patel KT**, Chair of Science and Technology Committee, House of Lords

[Q1433–1564](#)

Published written evidence

The following written evidence was received and can be viewed on the [inquiry publications page](#) of the Committee's website.

C numbers are generated by the evidence processing system and so may not be complete.

- 1 ABPI (The Association of the British Pharmaceutical Industry) ([C190098](#))
- 2 Academy of Medical Sciences ([C190102](#))
- 3 Apple ([C190017](#))
- 4 BIVDA ([C190082](#))
- 5 Barr, Dr G D ([C190056](#))
- 6 Battye, Rose ([C190040](#))
- 7 Biochemical Society ([C190088](#))
- 8 Blott, Richard ([C190039](#)) and ([C190049](#))
- 9 British Pharmacological Society ([C190075](#))
- 10 British Society for Immunology ([C190093](#))
- 11 Care England ([C190021](#))
- 12 Clark, Dr Andre ([C190008](#))
- 13 Centre for Genomic Pathogen Surveillance ([C190090](#))
- 14 Cheng, CEO Andersen (CEO, Nomidio & Post-Quantum) ([C190028](#))
- 15 Cole, Dr Jennifer ([C190002](#))
- 16 Daniels, Professor James (Former DfID Quarantine Manager, Ebola, VQF Hastings, SIERRA LEONE, WHH Dfid Funded) ([C190051](#))
- 17 Davies, Nick (Research Fellow in Mathematical Modelling, London School of Hygiene and Tropical Medicine) ([C190037](#))
- 18 Department of Health and Social Care ([C190057](#)) and ([C190112](#))
- 19 Earlham Institute ([C190024](#))
- 20 Emergent BioSolutions Inc. ([C190058](#))
- 21 Evans, Ken ([C190100](#))
- 22 Everbridge ([C190019](#))
- 23 Faculty of Pharmaceutical Medicine (RCP UK) ([C190091](#))
- 24 Fenton-O, Mark ([C190009](#))
- 25 Fight for Freedom: Stand with Hong Kong ([C190052](#))
- 26 Finlayson, Ashley ([C190060](#))
- 27 Ferguson OBE, Professor Neil (Professor of Mathematical Biology, Imperial College London) ([C190041](#))
- 28 Global Disability Innovation Hub ([C190104](#))
- 29 Gonzalez-Rodriguez, Dr Jose (Associate Professor in Analytical Chemistry, University of Lincoln) ([C190078](#))
- 30 Google ([C190015](#))
- 31 Gough, Professor David (Director, EPPI-Centre, University College London) ([C190097](#))

- 32 Guinchard, Dr Audrey; and Dr Subhajit Basu ([C190029](#))
- 33 Head, Mr Michael (Senior Research Fellow in Global Health Clinical Informatics Research Unit, Faculty of Medicine, University of Southampton) ([C190067](#))
- 34 Health Research Authority ([C190096](#))
- 35 Health and Safety Executive ([C190033](#))
- 36 Hebard, Peter (Covid Task Force Coordinator, IMechE Covid Task Force) ([C190042](#)) and ([C190054](#))
- 37 Hilton, Mr Samuel (Research Affiliate, Centre for the Study of Existential Risk); Toby Ord (Senior Research Fellow, Future of Humanity Institute); and Haydn Belfield (Academic Project Manager, Centre for the Study of Existential Risk) ([C190076](#))
- 38 Home Office ([C190036](#))
- 39 Imperial College London ([C190038](#))
- 40 Institute for Life Sciences, University of Southampton ([C190071](#))
- 41 Institute of Development Studies ([C190089](#))
- 42 Institute of Physics and Engineering in Medicine ([C190087](#))
- 43 Institution of Chemical Engineers; and International Society for Pharmaceutical Engineering UK Affiliate (ISPE UK) ([C190068](#))
- 44 Keeling, Professor Matt (Professor, University of Warwick) ([C190032](#))
- 45 Kime, Mr David Allan ([C190001](#))
- 46 Kolstoe, Dr Simon (Senior Lecturer in Evidence Based Healthcare, and independent chair PHE Regulation & Governance Group, University of Portsmouth/PHE) ([C190086](#))
- 47 Lawson, Dr Aaron (Lecturer in Environmental Health, Ulster University; and Contracted Research Associate, Safefood Ireland (The Food Safety Promotion Board)) ([C190006](#))
- 48 Lewis, Dr Gregory ([C190107](#))
- 49 Lin, Professor Xihong (Professor of Biostatistics, Harvard T.H. Chan School of Public Health) ([C190013](#))
- 50 Lord Dowding Fund for Humane Research ([C190095](#))
- 51 Loughhead, Professor John (Chief Scientific Adviser & Director General, Department for Business, Energy and Industrial Strategy) ([C190046](#))
- 52 MacKay, Prof Robert ([C190027](#))
- 53 Maroso, Mr Gabriele (Co-Founder Associate, Onfido) ([C190014](#))
- 54 McAllister, Hayden ([C190069](#))
- 55 National Institute for Health Research (NIHR) Health Protection Research Unit in Emerging and Zoonotic Infections; University of Oxford, Nuffield Department of Primary Care Health Sciences; and University of Liverpool, Institute of Infection and Global Health ([C190084](#))
- 56 National Institute for Health and Care Excellence ([C190092](#))
- 57 National Physical Laboratory ([C190094](#))
- 58 Newton, Professor John (Director of Health Improvement, Public Health England; and Government's Government adviser on increasing Covid-19 testing capacity, Public Health England) ([C190034](#))

- 59 Northumbria Law School, University of Northumbria at Newcastle and the Centre for a Spacefaring Civilization; Northumbria Law School, University of Northumbria at Newcastle and the Centre for a Spacefaring Civilization; Northumbria Law School, University of Northumbria at Newcastle and the Centre for a Spacefaring Civilization; and Northumbria Law School, University of Northumbria at Newcastle and the Centre for a Spacefaring Civilization ([C190059](#))
- 60 Nuffield Council on Bioethics ([C190045](#)) and ([C190062](#))
- 61 Powis, Professor Stephen (National Medical Director, NHS England and NHS Improvement) ([C190043](#))
- 62 Public Health England ([C190035](#))
- 63 RJALogix ([C190108](#))
- 64 Richardson, Professor Sylvia (Director, MRC Biostatistics Unit, Cambridge Institute of Public Health, University of Cambridge) ([C190113](#))
- 65 Riley, Keith ([C190099](#))
- 66 Roche Products Ltd ([C190085](#))
- 67 Royal Academy of Engineering ([C190101](#))
- 68 Royal Society of Chemistry ([C190064](#))
- 69 Royal Society of Edinburgh ([C190103](#))
- 70 SC Johnson Professional ([C190070](#))
- 71 Safer Medicines Trust ([C190079](#))
- 72 Schofield, Dr Stan ([C190012](#))
- 73 Science Policy Research Unit, University of Sussex Business School; Science Policy Research Unit, University of Sussex Business School; Science Policy Research Unit, University of Sussex Business School; Science Policy Research Unit, University of Sussex Business School; Science Policy Research Unit, University of Sussex Business School; and Science Policy Research Unit, University of Sussex Business School ([C190081](#))
- 74 Shanks, Professor Thomas ([C190010](#))
- 75 Simpson, Mr Karl (Director, JKS Bioscience Limited) ([C190047](#))
- 76 Smith, Sam (coordinator, medConfidential) ([C190016](#))
- 77 Snell, Mr Geoff ([C190074](#))
- 78 Society for Applied Microbiology ([C190083](#))
- 79 Taylor, Mr Christopher Marc (Chair, ISRCTN registry) ([C190077](#))
- 80 techUK ([C190022](#))
- 81 The Francis Crick Institute ([C190072](#))
- 82 The Future Vaccine Manufacturing Research Hub ([C190106](#))
- 83 The Physiological Society ([C190061](#))
- 84 The Royal Society ([C190110](#))
- 85 Thimbleby, Prof Harold ([C190005](#))
- 86 Tissue Solutions ([C190053](#))
- 87 Tyrzyk, Mr Roger (Country Manager, IDnow) ([C190018](#))
- 88 UCL Institute for Healthcare Engineering ([C190105](#))

- 89 UK Collaborative on Development Research (UKCDR) ([C190080](#))
- 90 UK Reproducibility Network Steering Group; UK Reproducibility Network Steering Group; UK Reproducibility Network Steering Group; UK Reproducibility Network Steering Group; UK Reproducibility Network Steering Group; and UK Reproducibility Network Steering Group ([C190063](#))
- 91 UK Research and Innovation ([C190073](#))
- 92 Universities Policy Engagement Network (UPEN) ([C190065](#))
- 93 University College London ([C190055](#))
- 94 Vaghjiani, Nikita (Public Affairs Adviser, Royal College of Physicians) ([C190007](#)) and ([C190025](#))
- 95 Vallance, Sir Patrick ([C190111](#))
- 96 Veneklasen, Mr. Ethan (Head of Advocacy and Communications, ID2020) ([C190031](#))
- 97 Watt, Dr Andrew ([C190109](#))
- 98 Wellcome Sanger Institute ([C190066](#))
- 99 Wilby, Professor Alvin ([C190050](#))
- 100 Yoti ([C190044](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the [publications page](#) of the Committee's website.

Number	Title	Reference
1st	The UK response to covid-19: use of scientific advice	HC 136